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NEW POPULAR EDUCATOR.

ENGLISH LITERATURE. - XII.
[Continued from Fed. FIL., p. 034.]



(After on Congress in Greeks "Assists and Medern Pleas of London ")

THE ELIZABETHAN PERIOD: THE DRAMATISTS.

NEXT to Shakekense in point of time-mong the greater Shakekense in point of time-mong the greater Shakekense in the shakekense in the perhaps, in genias, stands Joneson, always called by himself and like contemporaries, as well as by posterity, by the abbreviated title, Ben Joneson. Ho was bort in London, near Change Cross, in 1572, His family had a generation earlier been in prospervasa icknownshines, but haw as born to great poverty. He was the postlumous sen of a elergyman; but 169 his mother married for her second husband a briokhyper, and Jonson in early youth was obliged to hipper, and Jonson in early youth was obliged to the hinduses of William Cambel, however, he are ombied to become a colonier at Westminuter School. Ho offerwards severed for some time as a reddier in the Low Countries. But while still young, like many mother young man of his day, whose turters and mother young man of his day, whose turters and From metting be advanced, no other tide, to demands writing; and down to the time of his death, in JONF. bis diligence as a play-writer was unceasine. Singularly unfavouruble as the circumstances of his early life were for learning, Jonson's love of knowledge triumphed over them. His reading was xide and accurate, his nequalistance with classical authors very minute. He was beyond doubt one of the most learned men of a learned age.

Jonosa Ind written several plays—some prehaps of those still in esteience being among the number—but they land all proved failners, when in 1966 the coundly of Revey Mas in the Historian was brought out at the Globo Therica and its oneses was no contract to the Globo Therica and its oneses was no contract to the Globo Therica and its oneses was not not be the complete of the contraction that the reyr front rank of the dramatists. The repulsation thus established Jonosa continually increased, nor was it only as a dramatist that he was distinguished. In 1959 he become Foot Learnett, a post to which his poetical merits fully cutified him. And in the brilliant circle of wife and men of letters and the contraction of the contracti

Jonson's whole career shows us that the leading leatures of his character were strength of will, indomitable energy, and a proud self-reliance; and those high qualities were accompanied by a certain roughness and an outspoken freedom both in praise and blame. He certainly did not want the genuine kindness which secures friends, but was deficient in the geniality and tact which avoids or conciliates enemies; and he was constantly at war with some of his brother dramatists and poets. The very varied incidents of his career, and particularly the fact of his having at one time changed his creed and become a Roman Catholic, and afterwards re-joined the national Church, gave plenty of material for attack. His later days were clouded by poverty and ill-health, and what to a strong and selfreliant nature such as his must have been not less painful than either of these, the consciousness of failing intellectual powers.

Two of Jonson's plays are tragedies-Scienus (1603) and Catiline (1611). They are founded upon, and follow with singular fidelity, the authentic and contemporary accounts of the lives and deaths of the two men whose names they bear. The subject in each case was one likely to attract the faste of Ben Jonson. The conspinier of Catiline and the fall of Sejanus afford ample opportunity for the display of striking dramatic situations. They gave peculiar scope for Jonson's great power of noble and lofty eloqueuco. They enabled him to use his stores of classical learning; and the skill with which he has worked into his plays every expression, every hint almost, of the Latin historians and poets, and the completeness in every detail of the picture of Roman manners

and customs, are extraordinary. Yet Jonson's tragedies are read, we think, by few people with much pleasure. They are stiff and lifeless, and the characters are nureal. We are interested in the story, the speeches - everything except the men and women themselves. Catiline and Sejanus themselves are both characters purely repulsive, Their fate and their fall excite our wonder, and perhaps a feeling of horror, never our sympathy or pity. Nor is this want of human interest in the principal story balanced by any strong pathos in any of the subsidiary incidents in the play. When Shakespeare made the leading character in his play the base and odious tyrant John, he supplied the missing element of tenderness and pity by introducing the pathetic story of Prince Arthur. In Sejanus the one really pathetic incident of the whole play-the murder of the innocent children of Sejanus, and the grief of their brokenhearted mother-forms no part of the action of the play; it is simply related as a fact in an eloquent but not very appropriate speech, within a few lines of the end of the play.

Of far higher merit than these two tragedies are the comedies of Jonson. These are strongly contrasted in many respects with the comedles of Shakespeare and most of his contemporaries. Jonson's plots are always most carefully and skilfully claborated. He is never content to follow the usual course of 'his brother dramatists, and take the story of some Italian novel or earlier play. following the narrative of the original with only such alteration as is absolutely necessary for stage offect. And from this cause Jonson's comedica are peculiarly effective as plays, and carry on the interest of the reader to a remarkable degree. His style is always clear, manly, and vigorous; it is never vulgar or commonplace, seldom deficient incase and simplicity, though, as compared with Shakospeare and many others among the dramatists, it has an air of deliberation about it.' It is like a noble building creeted by art, rather than a tree of spontaneous growth. His extensive learning farnished him with an inexhaustible store of words, phrases, and longer passages from the ancient writers, which he uses in general with admirable judgment. But now and then his learning has betraved him into a fault. Thus when Knowel. the prudent and matter-of-fact merchant in Ercry Man in his Humour, pours out an elequent distribe. borrowed from Juvenal, on the wickedness of the . age, and especially on the vices of parents grown the corruptors instead of the protectors of their children, everyone must be struck with the incongruity between this and the whole tone of society depicted in the play, and must feel that

»horevier true of Roine in the days of Domittan, the not true of Reginal in the days of Himbert, The mornity of Granuton the days of Himbert, The mornity of Granuton's plays is always pears. He is often course is exceptession, nothing cam be roused agrouser than some of the language and some of the granuton of the scenes in his best connection—the Arbestein's, for instance. But this is merely the commences of his times, when me did not hestitude to speak openly of the state of the scenes of the scenes

One characteristic of Jonson's comedies must strike overy reoder-that though they are comic and hamorous always, yet they are, above all, satirical. Except when they are broadly farcical, they are keen satires upon vice; upon hypocriey, sensuality, avarios. And this though, perhaps, owing partly to the somewhat severe cast of Jonson's mind—is still more, no doubt, connected with the defect in his dramatic genins to which we have already referred, his inability to produce life-like characters. Those who people Shake-speare's stage are real men ond women, with all the ordinary passions of humanity, and strongly marked individuality, though showing also, it may be, the special prominence of one quality or the peculiar characteristics of a class. Jonson has occasionally drown a character with some life lngly, such as Bobadil, the cowardly braggart in Every Man in his Humour. But, for the most part, his characters are not much more than mere em-bodiments of abstract qualities, or mere types of partioulor classes of society.

The best among Jensen's coincides are Revey Alea for the Immer, the Alchewite (1649), the School Thomas (1600), and Felpoin, or the Pass (1600). Alea for the Immer (1600), and Felpoin, or the Pass (1600). The Committee of the School Thomas (1600), and Felpoin, or the Pass (1600), and with the Committee of the School Thomas (1600), and with the Committee of The Immer (1600), and the Committee of the Immer (1600), and the configuration of the School Thomas (1600), and the configuration of the Immer (1600), and the configuration of the Immer (1600), and the Committee of the Immer (1600), and Immer (1600)

"What should I do
But cocker up ny gentus, and live free
To all delights my fecture calls in to
I have no wife, no parent, child, ally
To give ny substance to; but whom I make
Must be my left; end tids makes men observe me
This chinws nev clients injuly to my house.

Women and men, of every sex and nge,
That bring me presents send me plate, coin, jourcis,
With hope that when I die (which they expect
Each greedy minute) it shall then return
Tenfold upon them; whilst some, overcons
Above the rest, seek to engress me whole,
And counterwork the one winto the other.

Control in fight, as they would man in large

From a Picture by Hantharst.)

All which I suffer, playing with their hopes, And am content to cole them into profit, And hook upon their kindness, and take move, And look on take; total bearing them is hand, Letting the cherry thook aguest, their lips, And draw is by their mouths, such back again.

The competition in degraded scivillity between the foltowers; the trick to mislead them of Mosco, Volpone's cunning and ready parasite; the brutal attempts of Volpone to grafitly his lust by violence; the base conspiracy of all these to convict the innocent; and the final exposite convict the innocent; and the final exposite convicts the innocent; and the final exposite convicts that the property of the propert

Traces relations note moirs cause or transmant conpositions of Jonesch which must by no means be overlopeded; it is one for which he stands without a part of his days to compose a vest another of these part of his days to compose a vest another of these vasceuss or extertalments which were so much in vege as the period. In these contrataments the gentlemen and halies of the Court, or the mombers of an inn of confr, or other bottles of parsons, went to take part. Their plots and the obsarders represented were borrowed from the classical or the fairy. mythology. Sometimes the inhabitants of these very different regions of the imagination met upon the same stage. The pieces were illustrated by elaborate scenery and by appropriate dances. Suppleces afforded the most admirable opportunity of delicate flattery, for the judicious upor of Joneson's varied learning, and the exercise of his inexhaustible invention and nociciou power, is inexhaustible invention and nociciou power, is

BEAUMONT AND PLETCHER.

It was a very common practice in the age of which we are writing for two or even more dramatists to combine in producing a single play. Probably these combinations were generally unions to the producing a single play. The producing a single play and the play of the play the play they had beapoken more quickly than one man could prepare them, or who whilst to secure the pealiar skill of different hands for different secule effects. The pratracting of Besumont and founded upon the warmost funching, and leasted as long as they both lived.

John Fletcher was born at Ryo in 1576. His father was a bishop, and filled successively the sees of Bristol, Winehester, and London. Soon after he was translated to the last-named see he incurred the displeasure of the Oncen by a most improdent, and almost indecent, second marriage, and he was for some time suspended from his bishoprie. His promotions, too, with their burdensome incidents of fees, first-fruits, and other expenses, had followed one another with fatal rapidity. The consequence was that he died in emhartassed circumstances, leaving only a very scanty provision for his family. His son, the poet, in all probability, therefore, began life amid the same poverty as most of his brother dramatists. He received, however, a university education at Benet College, Cambridge, and from his works it seems probable that he was a competent, if not a profound, scholar.

Francis Beaumout was born in the year 1386 of an ancient family, which had for some generation been settled in Leicsetershire. His father was a judge of the Court of Common Pleas. He himself received his education at Brandgate Hall (now Feminoric College), Oxford, and upon leaving the university beaume a student of the Inner Temple. He soon, however, abandoned the study of the law and entered upon the more congenial pursint of literature.

When or how the intimacy of these two men began we cannot tell. Both had certainly appeared as poets, Fletcher very probably as a dramatist, before they began to work in concert. Both were among the younge friends of Den Josson, and loth soom to have been regarded with peculiar affection by that great literary chief; and it is not improbable that they met and formed their lifelong friendship and the brilliant circle of wits and poets over which Josson presided. However this may be, it is known for certain that free; an early period the two men lived together on terms of the closest intimacy until the 'marriage of Boaumont, and that their literary partnership continued until Beamount's death; in 10th. Fletcher survived his friend and fellow-worker only ten years, dying in 1029.

The plays which have come down to us, bearing the joint names of Beanmont and Fletcher are very numerous, rather more than fifty in number. Which out of the long list were really the joint productions of the two friends it is in many cases impossible to dotermine. Some of them were probably written by Fletcher before the literary partnership was formed; semo were certainly written by him after that partnership had been dissolved by the death of his colleague. But where to draw the line so as to distinguish precisely the plays belonging to those several periods cannot be accurately ascertained. and still less is it possible to say what portions of the plays jointly written are to be attributed to Beaumont and what to Fletcher. It is a generally received tradition that the genius of Beaumont lay more in the direction of the tragic and pathetic than that of his colleague; while the comic powers' of Fletcher were more strongly marked. And this is probable, though not certain. Their plays range over the widest diversity of character, from severe and lofty tragedy, such as the very powerful play of the Maid's Tragedy, to the broadest burlesque, like the Knight of the Burning Pestle. But the plays from which, probably, all readers derive the greatest amount of pleasure are of a class intermediate between these two extremes. Beaumont and Fletcher have left us a large number of romantie dramas, belonging to much the same class as the majority of Shakespeare's comedies, a class of which the very pleasing play of Philaster, the play which is said to have established their fame as dramatists. is an excellent specimen.

almost all of them, like Shakespeare's, borowed from Halian nowlists or play-writers. They are, for the most part, worked out with discretion and good taste, though the authors show neither the elaborate diligence of Joneon in this department, one the consumnate judgment of Shakespeare. In one point, however, the plays of Bennmont and Pstebber stand especially high, that is, in damnatic

The plots of Beanmont and Fletcher's plays are

effect. Some of the scenes in the Maid's Tragedy, especially that in which Evadae, the guilty wife, reveals her infancy to her linsband, seem to us nmong the most striking in all our dramatic literature. In delimention of character these authors are far more life-like than Jonson, though, as compared with the greatest dramatists, they each want both depth and variety. Their style is peculiarly attractive. It is always clear and perfeetly intelligible; and though without either the wondrous wealth of metaphor which belongs to Shakespeare alone, or the dignified eloquence of Jonson, it is an instrument admirably adapted for the expression of passion or the simpler purposes of description. The great blot upon the plays of these writers is their indecency. All the literature of their ago is coarse, for men's tastes and habits of life were coarso. But the indecency and immorality of Beaumont and Fletcher is not merely . a matter of expression; it is too ofton woven into the very texture of the play, and pervades alike the plot, the characters, and the language. One, at least, of their plays is among the most impure in the language.

A better specimen for study can hardly be chosen

among the plays of Beaumont and Fletcher than the play we have already mentioned. Philaster. The story is dramatic, if not very probable. Arethusa, the daughter of the King of Sielly, is betrothed to a Spanish prince, but her affections are given to Philaster, the rightful olaimant to the throne, excluded from it by the result of an unjust civil war. As the lovers cannot meet openly, Philaster sends to his mistress a beautiful boy, who has by a strange chance come into his service, to be the medium of communication between them. This plan seems to work admirably. But a wanton lady of the Court, detected in a scandalous intrigue with the Spanish prince, in her anger charges the princess with an undue attachment to the boy who attends hor. This charge is believed by the king, the courtiers, even by Philaster. The usual wanderings from home and sudden meetings in forests follow. In time Philaster and the boy Bellario get thrown into prison on a charge of attempting the life of the princess. But the people rise against the king, and restore Philaster to his rights; and, all misunderstandings being removed, and all parties reconciled, the play ends happily. Every one of the characters in this play is forcibly and. pleasingly drawn. But the main interest centres upon the boy Bellario, in whom, throughout the play, the combination of confageous devotion with a clinging tenderness is exquisitely depicted. In the end Bellario turns out to be no boy, but Emplerasia, the daughter of a lord at the Court, who

had been among the most eager of the persecutors of Bellario. The passage in which this discovery is made will afford a good example of the style of Beanmont and Fletcher:—

"My father oft would speak Your worth and virtue; and as I did grow More and more apprehensive, I del thurst To see the man so praised. But yet all this Was but a maiden longing, to be lost As soon ay found ; till, sitting in my window, Printing my thoughts in lawn, I saw a god I thought (but it was you) enter our pates, My blood flew out and back again, as fast As I had puffed it forth and sucked it in Like breath ; then was I called away in haste To entertain you. Never was a man Heaved from a sheep-cote to a sceptre, raised So high in thoughts as I; you left a kiss Upon these lips then, which I mean to keep From you for ever; I did hear you talk Far above singing. After you were gone, I grew negnalated with my heart, and searched What stirred it so; alas, I found it love? Yet far from last: for could I but have lived In presence of you, I had had my end, For this did I delude my noble father With a fergued pilgrimage, and dressed myself In liabit of a boy; and for 1 knew My blith no match for you, I was past hope Of having you; and under tanding well That when I made discovery of my sec I could not stay with you, I made n vnw By all the most religious things a maid Could call together, never to be known Whilst there was hope to hide me from men's eves. For other than I seemed, that I might ever Abido with you. Then sat I by the fount Where first you took me up."

The following is Philaster's account of his meeting with the disguised girl at the fountain:-

" Hunting the buck, I found him sitting by a fountam-side, Of which he borrowed some to ouench his thirst. And paid the nymph as much again in tears. A garland lay bim by, made by himself, Of many several flowers, bred in the bay, Stuck in that mystic order, that the mrene Delighted me; but ever when he turned His tender eyes upon them he would ucen, As if he meant to make them grow again, Seeing such pretty kelpless innocence Dwell in his face, I asked him all his story: He told me that his parents gentle died, Leaving hun to the mercy of the fields. Which gave him roots; and of the crystal springs, Which did not stop their courses; and the son Which still, he thanked him, yielded him his light, Then he took up his garland, and did show What every flower, as country people hold, Did signify; and how all, ordered thus, Expressed his grief, and to my thoughts did read The prettlest leature of his country art That could be wished; so that methought I could Have studied it. I gladly entertained bin, Who was as glad to follow."

ARCHITECTURE. - X. [Continued from Fol. FII , p. 834.]

GOTHIC ARCHITECTURE IN ITALY, GERMANY, AND SPAIN.

THE pointed style, as developed in France, was not recognised in Italy or Gormany till the middle of the vault. In Italy they preferred wall pointings and morates, and consequently the walls of their churches were retained and prepared to receive freezo' paintings or messic pictures, and their windows wore kept small and filled with clear glass, so as not to interfere with the colouring of the walls. Their floor's were carrielood with magnificent martile

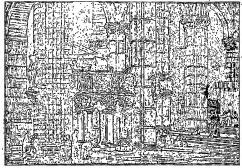


Fig 33,-SIENA CATHEDRAL

the thirteenth century-that is to say, the roundarched style known as the Romanesoue was adhered to for a century after it had been discarded in France. This may be accounted for in Germany from the fact that the round-arched style had already there been carried to such perfection that they were unwilling to introduce a form of arch which was out of harmony with their own national style. In Italy it would seem to have arisen from another cause. We have, in our description of the French cathedrals, pointed out how, in the twelfth or thirteenth century, the demand for painted glass, not only as a decorative feature, but as a field for the display of the history of the Christian religion. had led the French architects to cularge their windows by the employment of innilions and of tracery, so as to virtually fill up all the wall space that existed between the main piers which carried

pavements, and, to keep the interior in harmony, their cellings were painted blue and enriched with gold stars. This predilection in favour of printing (in which, it is true, they sarpased all the world) was fatal to that appreciation of all those constructive features which, appropriately decontact, were of the vory essence of the French and English Gothic style.

One well-known example may be taken as an isstance of this predilection, via, the Chaple of the Arean painted by Giotto, and which, without its printings, is simply a barn. The principal attraction of the Italian enthedrals lies, first, in the beautiful marbles with which they are encrusted both externally and internally (the core of the wall being in brick and steep); and second, the exquisite soulptured figure and comment with which they are enriched. The forms which the artists was called.

in to decorate are frequently ungainly and wanting in proportional scale, but the decoration in marbles of varied colours, in mosnic, and with rich sculpture is so beautiful that we forget the masses to which it is applied. Unfortunately, there are many cases in which the decoration has never been applied, and where the original forms of the buildings still retain their ungainly shape; and the system of erecting the building first, and then of calling in another artist to decorate it, has led to the introduction of sham fronts, so that on looking at them from the back we see that the real forms behind them were not adhered to by the artist. This was not done in the earlier buildings, and the eathedtal of Pisa, already described under the Romanesque style, is a striking example of truthfulness of construction and of decomation. .

The exthedrals of Siena (Fig. 38), Orvieto, Genoa, Ferrara, and Floroneo may be taken as types of the best examples. The principal front of Siena Cathedral, utilit 2324-1389, consists of three great portals decounted with soulpture—a rose window lighting the mave in the centre—and is crowned by three great guides, the centre one higher than the others, great guides, the centre one higher than the others, and ables, and virtually, therefore, shown and ables, and virtually, therefore, shown it faced with black, red, and white marbles, richly corred with folinge ind flagree scalipture.

The towers of Italian, eathedmis are invariably separated from the main building, and form what are known as campaniles. The example at Stans is faced with marble in attendate bands of blanck and white, and is unonconous, owing to its too equal division, it is recovered by a central occurs and spire and four planacles, a pleasing variation from the largy cornic of Frate and other Italian towns. The cathedral of Orrieto was commenced in 1290, but not terminated till the stateenth century, its chiefe characteristic is the mosafo-decomption with while like from was encursed about 12321.

The eathedral of Florence, better known as Santa Maria dei Fiori, is in many respects the finest mediaval church in Italy, though its crowning feature, the dome, was not carried out till the fifteenth century in the Italian style: The pian consists of nave and aisles leading to a central octagon with three apses, north, south, and east. The paye is 55 feet wide and 280 feet long. being divided into four bays only (in Westminster Abbey the same length is divided into twelve bays), so that its size is not apparent. Internally it is wanting in effect, as its walls have never been covered with the frescoes originally contemplated. It is therefore in its exterior that its beauties are chiefly to be found, in the rich marble decoration and in the beautiful tracery of its windows. The front

has within the last few years been completed more or less in harmony with the rest. The campanile by Giotto on the south side of the eathedral is the most beautiful example in Italy (Fig. 39). It is decorated with marbles of various colours, and divided into four storeys of different heights, the belfry windows of the upper storey being of great beauty and delicacy, and is, in fact, the only really perfect example of a marble-cased structure; on the lower storey the panels are carved with figure subjects designed by Glotto, but carved out by his papils after his death. The baptistery on the west side of the cathedral is an octagonal building very classic in design, and chiefly known for the three bronze doors on the north, south, and east sides: the first by Andrea Pisano, 1330; and the other two by Ghiberti, 1400-21,

The church of the Franciscan convent at Assis, remarkable for its freeces by Giotte, has nothicotaral features of much value, and in the interior the greater value of having riles to the want earlier by shufts (instead of painted bands, as in the chapel at I radius before referred to) is no none receiption. The south entrance proch is one of the best examples of geometrical design in Italy.

The cathedral of Allian is the largest in Italy, covering 108,000 square feet. It is cuttledy eased hedde and outside with white maible (excepting the vantle, which is painted in instanton tracery), and is profusely decorated with figure southerns it was commenced in 1885, and conscented in Italy, and although the most admired in Italy, at it was commenced in 1805, and conscented in Italy, at it is perlups, the finest example in Europe; it is divided into nave and double ables, the inter-being almost the sume height as the former.

Numerous examples of secolar and domestic arelitecture are found through Italy, chiefly characteristic by their extreme simplieity when contrasted with the rich marble easings of the enthearlis and churches. The chief examples are the Palazzo Cechio (1298) and the Palazzo del Podesth (1332), both at Florence, and the Palazzo Del Publica, at Siona (1296-1300), which, with its lofty campanile, forms one of the grandest buildings in Italy.

It is, however, in Venice that we find the best development of secular 'Gobbia rachitectura.' The Dogos Palaec (Fig. 49), commenced in 130), and the Cond'oro (1309) being the two principal examples. The Gothic portion of the palaec consists of the entrance gateway (the Porta della carta), the intest portion built 1439-13—the front fincing the plasetta of Sk. Mark—and the front fincing the Pink de Schiavoni on the Moto. The building is all vided into three storeys: the lower storey of pointed

with rightly carved capitals (the lower portion of these piers is hidden, the payement of the piazzetta having been raised about 15 feet; they had no bases, but were supported on a stylobate of three

storey consists of four central agec arches with quatrefoil circles of tracery above, all richly moulded. two arches to each one below: the upper storey is conal in height to the two lower ones. it is built in brick and faced with marbles of two colours, forming a ilesign over the whole surface, and is pierced with large painted wmdows, filled probably at one time with tracery. A pierceil stom cresting forms the purapet. The Gothic churches of Venice. of which the principal examples me those of St. Gipvanni e Paolo (1246-90) and Santa Maria Gloriosa del Frari, do not contain any special features which, in a general survey of the style, require notice, so that we now pass on to Germany

steps). The middle

Fig. 39,-Giotto's Campanile, Florence,

German The builders clung to their more perfected round-arched Gothic work of the Romanesque type for more than a century after all the chief characteristics of the pointed style had been developed and perfected in France. The two carliest examples of the pointed Gothic style are the church of St. Mary at Treves-built on the site of the round church elected by Helena the mother of Constantine, in imitation of the church of the

equilateral arches carried on cylindrical piers, ' Holy Sepulchre-and the church of St. Elizabeth at Marburg (1230-40). The next examples are those of Strasburg and of Freiburg in Baden (1270-75)), the latter possessing a lofty western tower with pierced stone spire of great height and

of much beauty in design.

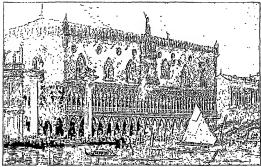
The great typical example of German Gothic is found in the cathedral at Cologne. the largest in North Europe, . covering an area of 91,000 square feet, This was commenced in 1270-75, and its general design was buséd on the enthedral of Amiens (1220 - 72), the principal differonce being that there are double nisles in Cologne (the outer nisles of Amiens being divided into chapels), and the front is virtually sperificed to the stupendous towers which. crowned by their pierced etono spires, constitute the highest structure in stone over crected.

. The cathedral of Cologue has also the special charneteristic of having been based on a uniform design throughout, though constructed at various periods, and

the same floor on which the first portion constructed, viz., the choir (finished in 1322), was set out, served still for the setting out of the upper portion of the, spires, and was only removed on their completion a few years ago,

The immense height of the vault, 155 feet from the payement, has the effect of decreasing the apparent length which, though 100 feet longer

than Westoninster Abbey, including the Confessor's Chapel, really looks much shorter. The great height of the western spires (638 feet) and the enormous dimensions of the towers which carry them dwarf the rest of the building so that it is Of civic buildings in Germany the Town, Hall of Brunswick is one of the few examples in stone remaining. In the north provinces on the Baltic, ut Lübbeck and Danzig, and in Hanover, are fine buildings in brick and terra-cetta, which are re-



The 40 .- The Door's Payers Vision

only when contrasted with the surrounding buildings that one is able to judge of its stupeudous size. Now that these are all being cleared away, 'this advantage is being lost, and its present effect is that of an overgiown monster.'

Though of moderate size, the cathedral of Ratisbon in Bayarla is one of the most pleasing examples of German Gothic, and it has the advantage of retaining the German apsidal termination to choir and nisles. The church of St. Stephen's in Vicano is an example of a type which, though common in Germany, and more particularly in the Baltie provinces, as at Lübeck, Danzig, and other towns, is rarely found in other countries. The nave and aisles are of the same height, and are covered by one stupendous roof. There is consequently only one storey inside, the triforium storey and the clerestorey do not exist, and all the light to the interior is admitted through the nisle windows, and although these rise to the height of the vault, the effect inside is sombre and dark.

markable for the elever way in which, with so small a material as brick, they have been able to obtain a monumental effect. The fluest example, however, in the north of Germany, is the great palace at Marienburg, once the residence of the Knights of the Teutonic Order; this was built at the and of the thirteenth century. The great hall of the knights is lighted by windows filled with stone tracery, one of the few examples of this material being used in this part of the conotry. Some of the Bayarian towns still retain Gothic buildings of similar work, the best examples being found in Nuremberg; here also still remain, as well as at Amberg and Rothenburg, the greater portion of the city walls with the fine circular towers, which add so much to the picturesqueness of the first named. Rothenburg also retains more or less the character of a medieval city, like Careassonne.

The steadily growing wealth of Flanders, from the eleventh to the sixteenth century, enabled her to creek enthedrals and churches of considerable importance, but he does not seem to have shared that subdoin impulse given to church construction in the fonteenth and fifteenth contarner. The exception of those great ecclesisated buildingscens to have been apread pretty equally over the second to have been apread pretty equally over the development of the style, and continued the execution of Gotinic churches for sorrly a century after other European countries.

The most important examples are the cathedral of Tournay, the greater portion of which, however, belongs to the Runamesone period; St. Guduk, liruseds (1220), and St. Martin, Ypres (1231), the finest and purest specimen in Flanders. Latter on we have St. Boudsand at Mathess (1332-

61), and the cathedral of Antwerp (1352-1111). The latter is one of the most remarkable charches in the country, covering on area of 70,000 square feet, and being shought in the fact of its buyber a mayo with three nisles on engh side, the cuter alsles (added at a later period) being almost of count width with the rave. This series of ables adds greatly to the effect of space of the interior, but one feels the want of a greater width of mave in order to assert its prodominance and its greater influence on the ables. Externally, its chief noticeable feature is the lefty north-west tower and spire (106 feet high), the latter being decorated with that beautiful plereed tracery which exists in Froiburg and Viouna, it was intended to carry thu south-western spire to the same height, which would have destroyed the picture-que value of the group. In the later churches of Flanders they reserted to the plain cylimbrical piers or columns insical of the complicated plers with numerous attached shafes, which hu St. Onen and other later churches lu Franco were condemned for their wire-drawn effect, and these simple circular plers give great breadth to the laternal effect. Where, how-ever, the cities of Flanders take the lead of all other European countries is in the municipal buildings which in the times of her greatest prosperity, from the thirtconth to the afteenth cen from the thriconti to the attenth centuries, sne creeted in the Gothie style. Of these the entlest is the Cloth Hall of Ypres, bullt in the thirteenth century, a building 410 feet in length. Then in the fourteenth century fellow the Town Hall and Trade Ifall of Brages, and in the beginning of the next contury the Town Hall of Brussels, with its

magnificant tower and spire, 374 feet high.
The Town Halls of Lowarian and Audenacede are
the most claborately decorated circle buildings of
the style. One of the latest buildings in the style
to the Town Hall of Glount, in which the beauty
of the lacework tracery of the windows, balconies,
and cornices of the building is set forth by the

plain simple massnry of the lower part. The Town Hall of Middelburg in Helland ranks second only to that of Ghent, and in all cases these cive buildlugs are decorated with sculptural figures, not only of bistoric but creat artisle value.

of listation but great articles value.

The earlier definite cathlorine of Sjohn war all tassed an Proceth Guithe work, but there me are all tassed and Proceth Guithe work, but there me are all tassed and proceed to the state of the state

placed is series of claspels. The large and extraction of the Cartesian line exheme, with the exception of st. Peter's at Bosso | In the entirednal of Serilia, which covers an ure of all 21000 square fort | In length is 115 feet, its total width 200 feet. The nave is 36 feet which, the height of vanit being 118 may is 36 feet which, the height of vanit being 118 length to which we have been seen in the constraint of the contraction of the contrac

coursel dome no to feet be disunder.

The Goldhe period in Spain intent my to the control of the

This lowers, applies some to the observed of an attention period, or wrants for this lowers applies some to the observed their forms its leading feature, and which is mere or less a copy of Irbilial corampies to the roat of the palmer rations, in its augie towers, steep roofs, and galde onsist, trenes of the earlier Reneisence obyle. Then only the continuous conditions to the continuous conditions of the continuous continuous

COMMERCIAL CORRESPOND-

[Continued from Pol. VII., p. 528.]

FRENCH, GERMAN, AND ENGLISH.

39.—LETTER WITH STATEMENT OF ASSETS
AND LIABILITIES.

Manchester, July 17th, 18-, Messrs. Wybourne & Ashford, Liverpool.

Gentlemen,—You will doubtless be acquainted with the sad position of trade in Germany, from the effects of the unsettled state of political affairs, in

that country.

Under those circumstances, it is quite impossible at present for the manufacturers to effect any sales, or even to raise money upon their stocks, which are considerable.

As you are nware, our chief business is with Germany, especially with —, the very centre of the war; you will therefore eastly understand that we are affected to a considerable extent by this unfortunate state of things.

For the last twelve months we have very much restricted our transactions, and endeavoured, but unhappily without much success, to collect our outstanding debts.

It is therefore with the deepest concern that we are under the painful necessity of informing you that, for the present, we are unable to meet all our ongagements.

We enclose an approximate statement of our assets and liabilities, from which you will perceive that the former greatly exceed the latter, so that even allowing 25 per cent. for any bad debts, there will still be sufficient to pay our creditors in full: Our debtors, as row will see by the same state-

ment, were all good bouses, whose difficulties arose in consequence of the events before mentioned and we doubt not that they will be able to resume their payments as soon as political affairs become a little more settled, and they are able to dispose of their goods.

We are preparing a balance-sheet, which we shall aly before our creditors at the meeting which we purpose holding on Monday, the 22ad, and at which we hope you will be present, so that we may submit to you the pxice state of our affairs, and, we hope, survive at an arrangement.

We are, Gentlemen,

Yours most obediently,

A. Mori & Co.

Manchester, la 17 juillet, 18— Messieurs Wybourne & Ashford, a Liverpool.

Messieurs,—Vous aurez sans doute connaissance de la triste position dans laquelle se trouve le commerce en Allemagne par suite de l'état incertnin des

I affaires politiques de ce pays.

Dans ces circonstances, il est pour le moment
impossible aux fabricants d'effectuer des veutes, ou
même de-se faire de l'argent sur leur marchandises,
oui sont considérables.

Sachant que nons faisons nos principales affaires avec l'Allemagne et surtout avec —, actuellement la thétare de la guerre, vous comprendrez facilement que le triste état des closes doit nous affectée beaucoup.

Depuis l'année dernière, nous avons considérablement restreint nos affaires et fait tous nos efforts pour effectuer la rentrée de nos fonds, mais malhenrensement sans grand succès.

C'est donc à notre grand regret que nous nous 'trouvons dans la triste nécessité do vous informer que pour le moment nous ne sommes pas à même de faire bouneur à tous nos engagements.

Nous vous remettous ci-inclus un relevé approximatif de notre actif et passif, par lequel vous verroz que le premier excède de bouncoin Je demier, de sorte que, même en allouant 25 pour cent pour les mausaises ordances, il y quira suffisamment pour payer tous nos créanolers.

Comme vous le verres par ce même relevé, nos débliems étient-itous de bonnes missons, mais qui se trouvent maintenant en difficultés par suite des événements cl-dessus mentionnés, et nous ne doutons pas-qu'ils soient à même de reprendre leurs paicments assistié que les affaires polítiques auron par une touraure plus calme, qui leur permettra de vendre leurs manoplandises.

Nous préparons notre blian pour soumettre à la réunion des créanciers, que nous pensons onvoquer pour le Lundi 22; nous espérons que vous voudrez bien y prendre part, afin de pouvoir vous présenter l'état exnet des nos affaires et d'arriver, nous l'espérons, à un arrangement. Recevez, Messieurs,

Nos salutations respectueuses,

A. Mori & Cie

". Manchefter, 17. Inf1, 18-. Serren Bhbourne & Afhford, Liverpool.

Es wird Ihnen ohne Ivoelfel befannt fein, in welch' trauriger Lage fich ber hanbel in Dentissand befintet, in Volge bes ungewissen Juftandes ber bolitischen Werchaltunge in zenem Lante. Unter bieben Umfanden ift es fire ben Augenblick ben

Fabritanten ganz unmöglich Bertäufe abznichließen, eter selbst Bordinise auf ihre beträchtlichen Worrattie zu erhalten. Wie Sie wissen, machen wie unser handiglichaft mut Beutlichland, beriell mit bem Sauttis bes Arreste.

Babrent ber letten molf Monate haben wir unfern Umfat

febr eingelderauft, unt une bemubt, leiter unt wenig Grfolg, unfere ausftebenten Goeterungen einzugeben.

unjere ausgeventen goeterungen einzugeren. Bir finten und tabir zu unjerm tiefften Bebauern in ber trantigen Lage Sie baven zu benachtichtigen, baf wir vererft nicht

im Stante fine, allen umeren Bereflichtingen nachtufemmen. Andef finten Die eine amidberne Anffiellung unferen Artier um: Bafficen, ann melder Die erfeben werten, bab im Gefferen bie Leiftern becennent überfleigen, jo baß felbft bei einer

Referentung von 25 Prezent fi e irgent weiche feblechte Schulben genftgend übrig bieiben wire um alle unfere Manbiger gu bezahlen.

We Die and terfelben Infiellung erieben, waren unfere Gentlung auf eine nach ein ermachten Ertagniffen einfanten, nur wir geriefen und tag tiefelben un ber Lage film mercen ibre Jahlungen wieter anignuchum folate ber refutfern Auffahrte fige etwas berubyt haben, webum folate ber refutfern Auffahrte fig etwas benubyt haben, web fie eine Ragen verlaufes fannen.

Wie eiegenten einen Bückerolichtig, ben wir unfern Cektlieren bei einer Wentag ben 22. enre. fattifintenben Berfammilhug verlegen werten, int erdwen un auf Ibr Größennen, min Ibngen ber artnelle Bofition ju unterbreiten, nne, wie wir boffen, ein Arranactmen berkrittifibren.

preparitungfreifft, A. Mori & Co.

40.-LETTER ASKING FOR STATEMENT OF

ACCOUNT CURRENT.

Paris, Sentember, 1898.

Messes, J. R. & N. Richman, London.

Gentlemen.—We are in receipt of your favour of . . . contents of which are noted.

As we are about to close our accounts on the 30th

September, we should feel obliged by your sentling us an extract of our account entrent with you up to that date. You may draw upon us for the balance in your favour at three days sight, which draft will meet with due honour on presentation.

We remain, Gentlemen.
Yours truly,
B. SOYER & Co.

Paris, septembre, 1898.

Messieurs J. R. & N. Richman, à Londres.

Messieurs,—Non- avons recu votre lettre du . .

et pris bonne note de son contenu. Régiant nos écrifures au 30 septembre, nous vous

scrious bien obligés si vous vouliez nous envoyer le relevé de notre compte commt chez vous, arrêté à cette date. Pour le solde nous vous autorisons à disposer sur

Pour le solde nous vous autorisons à disposer sur nous à trois jours de vue; nous réserverons bon acqueil à votre traite.

Nous vous présentous, Messieurs. Nos sincères salutations.

B. SOYER & CIE.

Paris, September, 1898.

herren 3. R. & D. Richman, Conton.
20 ir empfingen 3fr Berthes rem . . . rergemertten

Da wir im Begriff find unfere, Bucher am 30. Geptember abgnichtigen, erfuchen wir Gie im einen Rechnungenthing per geneb Datum.

jenes Datum.
Sie wollen ten fich zu Ihren Gunften erzebenten Salto brei Tage Sicht auf und einkehnen, tind bereiten wie Ihrer Tratte gebührenten Schup bei Gricheinen vor.

Sochadeungeroll, B. Soper & Co.

41.—ACKNOWLEDGMENT OF INVOICE, ETC.

Bradford, August 14th, 1898.

Messre. Simon & Co., Marseilles.

Gentlemen,—We have duly received your favour

of the 10th instant, enclosing invoice of 25 bales of cotton, amounting to 6,300 fr., which we have placed to your credit.

To balance this item, please draw mon us at

To balance this item, please draw upon us at three months' date, informing us of the sterlingamount of your draft.

If you have another small lot of similar quality

to offer, we should feel glad to receive samples as early as pussible.

We remain, Gentlemen, Yours truly,

ROBERT PALMER & SON.

Bradford, le 14 doût, 1898.

Messiems Simon et C*, à Marseilles, Messiems—Nous avons bien regn votre honorée en date du 10 commut, renfermant facture à 25 balles de coton, montant à frs. 6,300, dont nous vous créditous.

Pour balancer cette affaire, veuillez disposer sur nous à trois mois de date, et nous informer du montant de votre traite en livres sterling.

montant de votre traite en livres sterling.

Si vous avez un autre petit let de la même qualité
à nous proposer, nous serions enchantés d'en re-

cevoir des échantillons aussitôt que possible.

Agréez, Messienrs,

Nos salutations amicales,

ROBERT PALMER & FILS.

Bratfert, 14. Anguft, 1898.

Serren Sincen & Ge, Marfeilles. Wir befennen uns jum richtigen Empfang Ihres Gechrten, vom 10. euer. mit Gactine über 25 Wallen Bannnolle im Betrage wen fie G.300, welche Summe beie Ihnen eretitirt

unern. Um tiefen Gegenstand auszugleichen, wollen Sie 3 Monat bate auf uns ziehen und nus ben Sterlung Betrag Ihrer Aratte

Salle Gie eine artere Heine Bartie abnlicher Qualital gu

LIGHT.

sffreien haben follten, wurde es und angenogen fein, Minfter beron balbenbafticht zu erhalten.

Dechachtungsrollft, Robert Balmer & Gobn.

42.—LETTER ABOUT MISSING AND DAMAGED GOODS.

GOODS.

Paris, May 9th, 1898.

Messrs, Smith, Martin & Co., London.

Gentlemen.—We are

Gentismen,—We are in receipt of the package unafted S M 5, othered by your letter of the 2nd inst, and regret to state that, on comparing its contentis with the historice you sent us, we find there are five articles missing, and three others so full of spots and faults that they are quite unsatismly.

-We therefore take the liberty of deducting the value of those eight articles from the numer of your favelos, which, in consequence, will be reduced to £20 10.0.4, which, who was peaked to your credit.

Believo us, Gontlemen, Yours respectfully, CHARLES LAINS & CO.

Paris, le 9 mai. 1898.
Messiours Smith, Martin et 2., à Londres:
Messiours,—En possession du bellot marqué S M 3, avisé par voire lattre du 2, nous avons le regret de vous informer qu'en comparant le contenu de ce ballet avec la facture que vous nous avez envoyée.

nous trouves qu'il y n' m manque de cinq pièces, et que trois autres sont tellomènt couvertes de taches de defents qu'elles sont tout-à-fini javondables. Nous-prenons donn la liberté de définire la valeur de ces juit; pièces du montant de overte facture, qui so rédgim en conséquence à £270 10s. Od., dont nous vous créditons.

None your saluons, Messleurs,

Bien cordialement, CHARLES LAINE & Cir. Paris, 9. Stai, 1898.

Derren Smith, Martin & Co., Louden.
Mit kelisen von Packer B M 3 welches Sie mit Iseren.
Mich von J., einer vofften, wond bekanere demerten zu mößen, von beie bei Bergleigtung bes Inhaltes mit der Verturen fünftlickle vermissen, von fin den anderer der vermissen, von fin den merekanliche fein vertren.

Wie nehmen und bafer bir Breibeit ben Werth biefer acht Urtifel ven bem Betrage Sprer Bactura ju fagen, welcher baturch auf £270 10s. Od. reducitt verb. meifte Gie erfannt fleben. Bachachtungbiell,

Charles Saint & Co.

43.—LETTER ON EXORBITANT CHARGE FOR INTEREST.

Berlin, March 2nd, 1899.

Messrs, Arnold & Co., London.

Gentlemen.-We are in possession of . . . from

which we unfolded the extract of our account current with you, showing a balance in your favour of £5,683 3a. 6d. to 31st December, 1890, which we shall examine and curry forward in conformity, if found correct.

On looking through the account, we perceive that you charge interest at the rate of 7 per cent, which, permit us to remark, we find rather high, seeing that the average rate of discount at the Bank of England, during the last year, did not exceed 64 per cent. As explanation or this point would oblice.

Yours truly, ADOLPHE APPELU & Co.

Berlin, le 2 mars, 1899. Messieurs Arnold & Cie, à Londres. Messieurs,—Favorisés de votro lettre du . . . nous

: 5

Messiours,—Favorisés de votro lettre du . . . nous en avois retiré le relevé de notre compte courant ohez rous, présentant un soldo on votro faveur do £5,683 3s. 6d. an 31 décembre, 1890; ngus l'examinerons, 'et le porterous à compte nouveau, auxès process, 'et le porterous à compte nouveau, auxès

vérification.

En examinant cet extraît, nous nous apercevons que vous calculos les intérêts au taux de 7 pour cent, ce qui, permettez-nous de vous le faire observer, est un peu élevé, considérant que la moyaune de l'es-

compte à la Banque d'Angieterre, pendant l'année dernière, ne dépassa pas 6 pour cept. Oucloues explications à ce sujet nous obligeraient.

Nous vous saluons sinchromout,

ADOLPHE APPELU & CIP.

Berlin, 2. Mars, 1809. Gerren Bruoft & Co., Souton.

Wie bestehn Ihr Merches vom ... ben wir Ifren Neumangenerge untblichen, mit einem Arte vom 2500B. 300 vor 31. Desaufer, 1800, ju Ihren Immfen; war werten tenfelfem ischin und bei Neuflichen erüfenm mit Ihren vertragen. Beim Owerschen Ihren ihren der im den im Ihren Ihren Desaufen Ihren ihren ihren der ihren die Ihren Ihren Desaufen Ihren ihren ihren ihren ihren Ihren ihren Ihren Umertung-printfil hof flaten, to ibr Omersfanzie

Discento Rate ber Gant von England malgrent bes letten Jahres Gh. Bewent nicht überflieg. Eine Grifdenng biefes Bunttes ronte nus werbinten.

Gehachtungerell, Ubelubr Appelu & Co.

LIGHT. - VI.

Wir have seen that double convex lens will cast ha image of an object on to a screen. If the screen the image is directly cast on to be the back of the eye, and the conditions are such that the image now impears to the sight greater than the object, our

double convex lens has become a originifier or microscope. The single or simple microscope is a iteable convex lens. A flask full of awater hald on a page of a book makes the letters look bigger. A test tube (Fig. 50) filled with woter and tightly a

with water and tightly corked up also mannilles the letters, and many be conveniently

may be conveniently seed as a reading-glass, although, of coorse, on account of its cylindrical form, it sugnifies only in one direction.

The single lass used as a magnifier or advanced as to very mack employed by the field installable, and extended the control of the lass. Next head the lens slows to the copy. Alternate velo infance: It is the food langer to the lass. Next head the lens slows to the copy. Alternate velo infance: It is the food langer to the lass of the control of the lass. Next head the lens slows to the copy. Alternate velo infance it is not included the control of the lass to the large. The magnifying power of all distincting with it, i.e., the number of inches from the lens to the page. The magnifying power of all which was see the object mand distinctly by the food length. If the former is an inches and the control of the control

13 = 110m.

A line seen with the lens will appear 7ths longer than it is, and the number oxpresses the linear magnifying power of the glass. If we could read distinctly with a lens 5 inches from the page, and it had a focal length of 1 inch, its linear magnifying power would be 5, and its seperficial magnifying power would be this number squared, viz. 25.

HOW TO MAKE A SINPLEI MINISORDEP.
With inluste single lensus grace discoveries were made intentury. To make a lens of this sort, take a piece of giass red and bold it in the gas flaus until it is softens, then draw it not into two halves (Fig. 61). Each half ins a thread of giass attached; to it, and if the end of one of these threads be held in the flame it is notes and forms a globulo of giass. Break the giob-

ulo off and press it

which has been piercod in a thin siles of cork with a red-hot needle. With this lens held close to the eye, the point of a pin brought close to it appears nearly as blunt as the end of one's little finger. Any object one wants to

examine with it will have to be examined in this way attended to the end of the plu brought close to the globule of plass mounted in the cort. With such an instrument and by seek is method Lecuwenhock under a host of discoveries regarding the minute structure of things, which were communicated to the Boyal Society of London some two housted years ago.

LIQUID SIMPLE MICHOSCOPES.

Magnifying lenses may be formed by drops of Hogaid, Thus a thop of water suspended from a sleet of gluss forms a plano-convex lels, which will not as a simple

nikroscope (Fig. 62). Sir David
Browster succeeded in making
a lens of the kind of Canada balsana with a focal
length of only one fiftieth of an lock, and preserved
it for many years. Drops of water or of oils and
varnishes lineated in small apertures have take of
majorden as simplo microscopes.

THE CODDINGTON LENS.

There are some nursked defects attending the use of pherical letters as simple underscopes. There is too much dispersion, and there is also too much spherical aboration, i.e., the image is in some measure distorted by the outginst

rays not being properly broughs to a focus by a spherical tens. The dispersion and neberration are lessened by having the equatorial zone of the Prg. 52. This device is maulty called the Coddington lens; it was dovject, however, by Sir David Brewster.

'HOW THE SINGLE LENS MAGNIFIES.' The notion of a double convex glass in magnifying

The netters of a common convex guass in migrarying will be inparent on a few mineter consideration of Fig. 51. An object An is examined by mems of the lens L. A rny from A passes through the lens L, is bent or refracted, and entering the crois

Inneted, and contering the cyc is forther refunded by the crystalline a lens c, and is finally cast on to the back of the cyc or rettina nit

the point A. Light from a suffering the same influences is cast on to the retina at n'. An image A'n' is thus obtained on the retion, which is much larger than it would be if the less n were not interposed—in other words the double convex letis L has acted as a microscope.

THE COMPOUND MICROSCOPE.

The simplest form of compound microscope consists of two convex lenses, the one nearest the object being called the object-glass, and that nearest the cyo the cyc-glass. The object-glass forms an imagnified by the cyc-glass. Thus the object AB has an

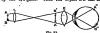


image A'n' formed by the object-glass L, and this is nugaticed by the cyce-glass B, the enlarged image A'n' being received on the retina (Fig. 55). The paths of the rays producing this image are shown in the diagram.

Owing to an upparent visual anomaly the object A" a" cast on the retina h an upright position sooms to the visual sense havered, and any movement of the object across the field of view is similarly contrariable to what it appears, thus a movement of the object observed to the right appears with scale, a combination of these as movement to the

The modern compound microscope is somewhat more complicated than the arrangement given in



Fig. 56. The eye-piece, for example, contains two o-convex lenses, EE and FF, La., a so-called field-glass Fr. in addition to the eye-glass BE, and the object-glass consists of two or generally three double lenses. The arrangement of two plane-convex glasses for the eye-piece was devised by Huygous, and is called the Huygonian eye-piece. These leases are placed within a tube, the eye-piece at 11 and the object-glasses at 0 (Fig. 57). is a stage z with a circular orifice, through which light can be reflected by the mirror M. If one be examining a transparent object, the glass slip on which it rests is placed on the stage, and light from a lamp is sent by the mirror a through the object into the microscope. The tube no is next gradually lowered until the thing to be examined is in focus. Should the object be an opaque one. a lens L is used for concentrating light on it while it rests on the stage and it is viewed by reflected light.

WHO INVENTED THE MIGROSCOPE?

It is not known who first applied the single lengas a nincroscope, but it is highly probable that it was so used by the ampionts. The Jansens of Middelburg are

credited with the Invention of the first compound microscope, and instruments made by the father and son vero presented to Prince Maurice and Albert, Archduke of Amstrin. The Archduku's microscone can into the lunds of Cornelius Drebell, who is sometimes spoken of as the inventor of the conneund microscope. In external appearance it was a gilt copper tube an inch in dla-

objects.



table an inch in thismeter and six feet long, supported by three brasspillars in the simpe of delphins on a base of ebonywhich also served the purpose of a stage for the

THE ASTRONOMICAL TELESCOPE.

The simplest form of toleocope is n tube with two-double convex lenses in it, so that at first it apprects one in no respect different from the compound inderescope. In the teleocope, havever, rays from the object, proceeding from a distance, fail inpost whereas in the compound inderescope the subsects of the compound inderescope the most object, and the subsect of the compound inderescope the subsect of distance, enter the object-plans lightly discrepant and form a numerical single power the prescript of the subsection of the subsect

Good and the complex of deaths convex leaves, one with a food laught of each size, and the other with a food laught of each length. The larger of the convex of the convex

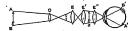
fixing in front of them rings of cardboard (Fig. 58) to out off the marginal rays. The object of these rings—"stops," or "disphragms"—is to eliminate the coloured ring from the field of view due to chromatic aberration. (See lesson V.)

With such a telescope objects are inverted; this, however, does not interfere with its use in viewing

the stars or planets, or forming part of an instrument like the spectroscope. In a telescope employed for viewing objects on land they must appear in their natural positions upright. This is effected by the addition of two convex eye-glasses to the astronomical telescope, or by the substitution of a double concare lens for its convex eye-glasses.

THE TERRESTRIAL TELESCOPE.

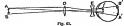
The arrangement of lenses is as in Fig. 59. To the object-glass o and the eye-glass E of the



astronomical telescope, there are two more eyeglasses K and K" added. E and K" have the same focal lengths as K, and they are placed a distance



apart equal to the sum of their focal lengths. An upright image is formed in the principal focus of x' at a, and this is seen erect with the eye-glass x''.



Each eye-glass being placed at the end of a sliding tabe, there is a difference in external appearance in the astronomical and terrestrial telescopes, which is shown in Fig. 60.

THE GALILEAN TELESCOPE.

The Galilean telescope shows objects in an erect or natural position, and it consists of an ordinary double convex object-glass, and a bleoneave eyeglass of small focal length as in Fig. 61. This is the plan on which open-glasses are constructed. The mys of light press through the object-glass and woold be brought to a focus at which the thin the

eye were it not for the interposition of the double coneave less E, which diverts them and makes them divergent instead of conver-

gent, so that a magnified image of the object is east on to the retina, and the thing looked at ameans erect and in its natural position.

THE REFLECTING TELESCOPE. .

In the telescopes so far described refractionsolely is concerned; in the reflecting referescope we have a combination of reflection and refraction. A simple illustration will enable the requer to see the principle on which it is constructed. A burnished spoon is held with it is tollow towards a gas finne; an image of the fiame is seen by the observer with his back to the light, and this he may magnify by means of a pocket iens. Such is practically the arrangement of a reflect.

(Fig.62.) A highly burnished ooncave mirror s of long foous is fixed at one end of a tube. The rays which enter the mouth of the tube m from the distant object are reflected back to an oval piece of plane mirror at r. which directs the rays into the eve-picce e. The observer at e sees a magnified image of the object towards which

ing 'telescope.



the tolescope is directed. This form is usually terimed the Newton-ian telescope, and its magnifying power is equal to the foral length of the parabolic reflector at a divided by that of the cyc-ginss at c. Sir-William; Herschelt constructed one of these telescopes from the control of the c

POLITICAL ECONOMY. -VJ. [Continued from Pot. PH., p. 338.]

TRADES UNIONS.

WE have spoken hitherto as if there were nobody concerned in fixing the actual payment of wages but employers and workmen, and as if workmen in a trade fixed the rate of wages by bidding against each other. This is the assumption made for simplicity, to begin with, by abstract political economy. In practice, however, the employers being much more able to combine than the workmen, the latter have found it necessary to combine too-partly to maintain their claims to a fair share in the aggregate product, partly to secure the observance of trade rules and oustoms, partly to give themselves a better chance in the bargaining which tends to settle the price paid for labour. Such combinations are Tamiliar in history; in England in the middle ages we find eraft guilds (including both masters and journeymen) fixing the rate of wages, and seeing that trade rules were observed. As the conditions of trade altered with the increase in machluery, these rules, and the "Statute of Apprenticeship" before spoken of (which was held to be limited to certain towns and trades) became so burdensome that manufacturers tried to get away from the towns where they were enforced; and so towns like Worcester or Coventry declined, while places like Nottingham, Leeds, Dewsbury, Oldham. Westbary in Somerset, and many others grew from villages into towns. Trade unions, then, arose, in most trades, about the end of the last century, when the general introduction of machinery and the factory system of production had upset all the old rules. Strict laws wore made against such combinations of workmen at various times in this century; but trade unions are now fully recognised, and few people would now say that society as a whole could well do without them altogether, whatever mistakes they may occasionally make.

No doubt, in the bargaining we have spoken of, each side must occasionally try and enforce its own riow by a lock-out or a strike, which involves commons waste and loss. But without a strong combination on both sides there could be no proper bargaining at all. And the stronger the combination, the more it will have at stake, the more likely it is to be wisely and pradently led, and the greater the prospect of a settlement of disputes without resort to a strike.

SOME SUGGESTED REARRANGEMENTS OF THE SYSTEM OF DISTRIBUTION.

PRODUCTIVE CO-OPERATION.

It has often been asked, cannot labourers be their own employers? Suppose that the men in a

certain trade save or borrow capital, form a company, work for it themselves, and divide the proceeds. They would then receive interest (if the capital were their own) and, at my rate," extreprenears profit." And as their gains would depend directly on the presperity of the company, they for it, which in practice a worksom excriting wages for it, which in practice a worksom excriting wages has not.

This plan has often been tited in England, but without conspicous success. Some few such societies have done well, many III. The management has been bad, or the equital toe small, or both. The plan (so far as can be judged at present) rather overlooks the facts (3) that ability of management is rate, and commands a higher prion in the market than _such of such societies can afford to pay; and (3) that individual business talent and board of management, which necessarily mores more sloyly and takes more time to see what is to be done.

All the capital invested in such purely productive co-operative societies in England to-day amounts to less than £1,000,000, or less than the amount owned by many single firms or companies worked on the entrepreneur system.

[We must, of course, distinguish this productive co-operation from distributive co-operation, which has in many ways been a very great success, and deserves high praise. This latter type aims at " getting rld of the middlemnn," and at giving the purchasers of goods a share in the profits on the sale, which are periodically divided among them in proportion to their purchases. Some of these societies-the best known of which is the "Roohdale Pioneers"have also an educational and social side, and do much to promote a corporate feeling among their mombers as well as a spirit of thrift. They sometimes also manufacture goods, but their main business is not production but distribution in a way offering more advantages, economic and moral, than that of ordinary retail trade.]

Profit sharing has proved more successful, particularly in France. There are many schemes, but the principle in all is the same. A certain portion of the profits is pataside in each year to be distributed among the workmen besides their wages, so that they have every inducement to increase the total.

Nist a much more comprehensive scheme—or set of schemes—is proposed under the name of Socialism. There are many Socialist parties, some four or five being of considerable importance and numbers in England or on the Continent, and they differ widely both in the details of the schemes they propose, and the way they seek to carry them

out. But the essential part of all the systems is this: that all the means of production and transport in the country-land, machinery, raw material, mines, ships, rallways—shall cease to be pravate property and shall belong to the State (or perhaps the various local authorities), which shall cither work them itself or let them to productive co-operanyo scoletics (opinion now soems to meline to the torner). Each person who is able to work shall be obliged to work at something, and be paid by the State. He will be free to do what he bles with his earnings, only he must not compete with the State by investing them as capital. In this way, it is held. the State would get the rent and profits winch new puss into private immis, would be able to apply them to a fairer distribution of wealth, and other ways beneficial to society, and would secure to overyone a fair maintenance; besides which, by settling how much should be produced, it would be able to prevent the crises and depressions of trade now caused by production in excess of den

Now the normal structure of commercial society is in some respects more like the Socialist bleat than like the state assumed by political economy. Instead of Individual Lusiloris, inbunrers, and empitalists, we have large joint-stock companies, labourers argustsed in unions, State-regulated rati-way rates, and frequent State interference with industry, while both the State and the unmichalities are large employers of inbour, and some English towns own their gas and water works and transways, which elsowhere are left to private enterprise But the theory was invented long before the collective production of the present day was as great as it now is. It came from Germany, and was principally connected with philosophical theories us to the nature of the State, which were really suggested in part by the practice of the Prussian Government in the last century. That Government at-tempted much towards the welfare of its subjects. ond, in fact, very greatly restricted their freedom; and the German philosophers who proposed Socialism were so familiar with the interference of Government in all departments of life that they saw nothing objectionable in its interfering a good deal more. To some extent, too, their advocacy of the system was based on doctrines of political oconomy which are now seen to be incorreoutrely or in part-the doctrons that all volno is derived from labour, and the " non law of wages" (so-called) which we have spoken of in connection with Population.

It is very doubtful, however, if the knowledge and wisdom of any Government is capable of mastering the facts of modern commercial society, at any given time, sufficiently to deal

with them satisfactorily; and a mistake would have far more serious consequences even than those of a commercial panic or a period of depression at the present day. State-men, too, are not always perfectly free from the suspicion of corruption For more than a contary they have been telerably free from it in England-but not so everywhere abroad; and had the Government the sole control of the production and distribution of the wealth of the country, there would be immense opportunities for a dishouest set of state-men to enrich themselves at the public expense. And the temptatic might prove too strong. No intequate check would (probably) be possible, because the public at large cannot be sufficiently informed either as to the actual facts of business at a given time, or as to the principles on which skilled business men conduct affairs. The unly check would in practice be a check by officials, and officials-in some cumtries-laive all been corrupt together.

Somewhat the same objection apply to the "Schumblattine of the Insul", "supported by many people who are not Scolibita, and best known from the wriness of the Insul's Harmy Google, from the wriness of the Insul's Harmy Google, which is the state of the Schubblattine of the Schubblattine of which you produce the Schubblattine with the state of wealth you good window the Schubblattine with the Schubblattine of which you will be supported in the late the national way to be supported in that the rate appeal to subject all fault to at the squall to the consumble yield. Thus, as the lambdattine would be ready to mobe it over to the Sitte. And we would not derive may be remore from its lamb, he would be ready to mobe it over to the Sitte. And

There is, no flowly, in this case also grent danger of corrupt management of the lind by the Government, whether central or local. I twould be so difficult, over if advisable, to make either this change or the more comprehensive ebanges involved in Socialism. Into we need not disease them further.

EXCUANGE, .

Folliteal economy is mainly the science of exchanges. As society advances, owing to the division of labour and the growth of trade, nearly and wealth is produced for the propose of being and wealth is produced for the propose of being aspecialty is most of the more advanced countries. We have before explained how the alveise of metablic money replaces bratter of goods for goods and facilitates exchange. And we have said that and facilitates exchange, for any contribution of the con

to express the former quantity in terms of one kind of goods-metallic money. Value so expressed is called price.

The term "money" usually includes gold, silver; and copper coin; while it would almost always be extended to bank-notes, and even niways be (loosely) to cheques and bills of exchange. But it is clear that these stand on a very different footing from one another; . Cheques and bills of exchange are only valuable so long as their holder is sure they are exchangeable for coin, Bank-notes are of no value if the bank fails:by which they are issued. Bank of England notes are practically (as well as legally) equivalent to certain amounts of gold coin, because the failure of the Bank of England is too unlikely to 'be considered. Nor are even silver and copper coin in England "money" in the same sense as gold. Nobody is obliged to receive copper in payment of a dobt due to him to the value of more than is. or of silver for more than 40s. But he cannot refuse - to receive English gold coln or Bank of England notes. . The law has selected one metal, and one form of printed promises to pay certain sums of that metal, and declared that they shall be "legal tender " for all payments—that is, if the creditor will not take them, the courts will not help bim to get anything else.

In some cases (as in-France some years ago) the - law has selected two metals as well as certain kinds of bank-notes as legal tender-gold and silver; and a similar plan is much advocated for adoption at present in all civilised countries (for reasons we shall deal with hereafter) under the name of Bimetallism.

Now the political economist, in defining money, excludes not only cheques and bills of exchange, but also bank-notes. Clearly their value depends on whether they are likely to be paid or not. If it is certain that they will be paid (as it is with regard to Bank of England notes), they will pass as equivalent to gold. If not, all the legislation in the world will not make them do so. He classes bank notes under "forms of credit"—which we shall deal with by-and-by,

Moreover, he distinguishes "standard money "and "token monoy." Standard money consists of the coins made of the metal or metals which the Govern-ment have declared shall be legal tender to any amount; while token money consists of the small poins introduced objetly to facilitate small payments. Thus a gold coin of the value of the two hundred and fortieth part of a sovereign, or even the twentieth part, would, be quite an impossible coin to handle, probably even to make; coins of a less precious metal—which originally were of about the same value, as that fraction of a gold coin

would be-have been introduced to pass as their equivalents. Such coins are made in England of silver and bronze, elsewhere of nickel, or an alloy called billen, . The economist calls them "token money," because the value of the metal contained in them may vary with reference to the standard, metal, oertain quantities of which they represent, and yet they continue to circulate as tokens, of those quantities. . "Money," in the strict economic sense, is confined to "standard money."

Now it, must be carefully, understood that the reason why standard money exchanges freely for goods is not due to the action of the Government. The control of the coinage by Government is a matter of convenience, to prevent frauds, to check delay in testing the coin, and to insure that it shall oirculate readily. But there is no reason in the nature of things why the work of coinage should not be entirely in private hands. Mr. Herbert Spencer once argued that it ought to be so; the only difficulty is—but it is a very great one—that of insuring that the coins should be what they profess to be. Few people know how to test coin, ur could do it in the hurry-of trade. But in many countries (as noticed in losson I.) foreign coin circulates quite as freely as the local coin, sometimes more freely. Spanish silver dollars; though not logal tender in the English West Indies, are said to be the cus-tomary standard own in some of the islands; and in parts of the East and of Africa silver dollars of one kind or another are so. When our troops made an expedition into Abyssinia, in 1867, large quantities of an old-fashloned Austrian coin of the last century, the "Maria Theresa dollar," were specially ordered by our, Government from the Anstrian mint, because the natives were familiar with that coin, and would take it more readily than eny other. Again, if a government debases its standard ooin, or if it issues paper money which it is not likely to pay for in standard metallic money, the value of suob coin or paper at once depreciates compared both with the former standard money and with goods: that is, a paper dollar will purchase less than a gold one. must always be remembered then that

standard money is simply one particular commodity chosen to do the work of exchanging others, and guaranteed by the Government stamp to be what it professes to be. Were there my doubt about this guarantee, the value of money would fall. Money is a kind of wealth; not the most important kind, for it is of no use to the owner till he parts with it; but, generally speaking, the most convenient form for small amounts of unused wealth, because it serves as a store for purchasing

power over roumodities. We say, "for small amounts," because wealth that is not needed for the inmediate wants of the owner is more profitably kept in other forms in which it can be directly applied to production, and this is made possible by the modern system of laushing and excilt. To keep a strong loss fint of sovereigns (quent from the rike of loss) would clearly be more waste; they had better be invested, i.e., put into the hunds of someone who can be trasted to use the wealth for which they can be exchanged in somehow producting more wealth, and pay the owner a share of the product. Banking helps to effect this in a way we shall prescript describe.

Now it is clear that if the amount of standard money in a country were (for instance) suddenly doubled, the amount of other commodities remaining the same, there would be just twice as much money to exchange for the goods, and so prices would be just doubled. If everybody woke up one morning by a miracle with exactly twice as many sovereigns in his possession as when he went to bed, the world would have that amount of extra gold, but would be no meher otherwise. There would be twice as many sovereigns to do the work of exchange, and everything (as soon as matters had settled themselves after this miracle) would exchange for twice as many. But there would be no more goods of other kinds, or fresh possibilities of enjoyment. From this illustration we can easily see that (so long as there is enough money in the country for anyone who wants to exchange goods for it to be able to do so) the quantity of money in the country makes practically no difference to the wealth of its inhabitants, except when we consider foreign trade. In this case it does make this difference -that the money is exported in exchange for goods, just like coal or wheat or any other commodity might be. Otherwise large quantities of specie in a country do not make the country wealthier Only so much is wanted as will give confidence that the banking reserve will be maintained. Now the "mercantile system," of which we spoke at the beginning of these lessons, made the mi-take of trying to get a great quantity of specie into the country and keep it there. The chief result was to raise general prices; people used more come in buying and selling than they of serwise would have, and dealt with larger sums in in daing up their accounts. But the country was porer, not richer, than it would have been otherwise, because the laws necessary to keep up the system prevented the owners of wealth from applying it in the ways in which it would produce most.

Apart from such legal restrictions-which have

never yet been effectaully maintained—gold and never yet been effectaully maintained—gold and sieiver tend to be constantly distincted over the constantly distinct on the suiden discovery of rich gold fields world. The suiden discovery of rich gold fields world for a hiert time-make gold in them. bank gold fields here, and pieces would rise. Best mer-tended to the suident for either mattions would a cone send in their channels of other mattions would a close send in their gold of the suident for the suident suident fields and above what we require for our own chreaktion, was taken not of the country in exchange for front profits.

General Rise and Fall of Prices .- The value of a particular thing at a given moment depends on the "relation between demand and supply." And itnormal or usual value depends on the normal relation-that is, on the amount of difficulty there is in increasing that kind of thing, or almost always on the cost of production. But now suppose the kind of commodity in which these values are usually estimated-that is, standard money-increases in amount, while the amount of goods and the purchasing power of each over all other goods remain the same. Clearly it will take more standard money to estimate the values-that is, prices will rise. Or if the sum total of goods increases in amount and value, while money remains the same, higher values will be expressed with the same amount of money-that is, prices will fall, Apart, then, from the prices of particular things, there may be a rise or fall of general prices, caused by the increase or decrease of money relatively to other goods. Such phenomena have often huppened in history. The two most famous cases are the rise when America was discovered, and quantities of gold and silver produced there-and probably much larger quantities which had been stored up there in various forms for centuries-were introduced into Europe; and the discovery of the Australian and Californian gold mines between about 1847 and 1853. Silver, which in the middle nges was the usual standard metal, rose steadily in purchasing power till the discovery of America, about 1500. In the next 150 years it fell to about one-third of its former purchasing power, then it rose again. Gold (says the late Professor Jevons) before 1600 was relatively to silver between the proportions of 1 to 10 and 1 to 12-that is, a certain quantity of gold would have from 10 to 12 times the purchasing power of the same quantity (by weight) of silver. About 1650, the proportion was as 1 to 15. For the first seventy years of this century it was as I to 152. Since then, increased production of silver, and the general dispec of silver as a standard metal (because as countries become richer they have to do with larger sums, and it saves a good deal of trouble to nay them with the more precious metal, gold), have caused the ratio

to change very much: it is now between 1 to 37, and 1 to 38. It is true there are not thirtyseven shillings to the sovereign, but, as we have explained, the relation of token coin to standard coin is arbitrarily fixed by law, and token coin is used only for small purchases.

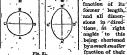
.The discovery of gold in California and Australia sent down the purchasing power of gold very considerably. Professor Jevons estimated that between 1789 and 1809 it fell 46 per cent.; between 1809 and 1849 it rose 145 per cent.; between 1849 and 1877 it fell 20 per cent.; and it is now alleged to be rising again. Its fall has been due to an increase in the supply, or to a decline in the demand, owing, it may be, to bad trade, perhaps in the first case cited to decrease of circulation owing to the European war; after 1849, to increase in the supply caused by the great gold discoveries. Its rise has been due mainly to increased demand caused by increased trade. After 1849, it would have fallen much more in value, only that the introduction of railways and ocean steam navigation, and the opening up of new countries, greatly increased the demand for gold coin, by increasing immensely the number of trading transactions.

APPLIED MECHANICS.—XIV ·

[Continued from Vol; VIII., p. 847.] APPLICATIONS OF THE LAWS OF TENSILE AND SHEAR STRESS AND STRAIN, STRENGTH OF

BOILERS AND PIPES—STRENGTH AND STIFF-NESS OF SHAFTS—PRACTICAL RULES AND EXAMPLES.

WE have referred to tensile and compressive stresses and strains as being simple; as a matter of fact, the result produced by either is not so very simple. Thus, if we take a small spherical portion of a wire, it will when the wire is subjected. to tension assume the shape of an ellipsoid, each dimension in the direction of the stress being lengthened by a certain



sions in directions, at right angles to this being shortened by a much smaller fraction of their

old lengths. Thus, in Fig. 81 a section of such a little portion A B of the sphere becomes A'B', or clongates A'B'- tensile strain. It comes to the same amount for any ordinate in this direction. The fractional lateral contraction or strain is

CD-C'D' Supposé the tensile stress to be 1 its.

per square inch, then - is the strain. The reciprocal of Young's modulus is generally denoted by the letter a.

The lateral strain corresponding to the longifudinal strain a, or stress of 1 lb. per square inch. is usually denoted by the letter b.

The connection between the different moduli to which we have referred may be stated as follows .-

$$E = \frac{1}{a},$$

$$N = \frac{1}{2(a+b)},$$

$$K = \frac{1}{a+b}$$

These statements we have not space to prove, but the reader is referred to the writings of such authorities as Professors Thomson and Tait or Perry for the proofs.

APPLICATION OF THE LAWS OF TENSILE STRESS. A very interesting application of the laws already given for tensile stress is that which enables us to calculate the strength of a vessel, such as a boiler or

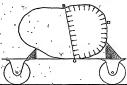


Fig. 82.

pipe, subjected to fluid-pressure inside. Evidently the material is in such a case subjected to tension; and if we assume the thickness of the metal to be small in comparison to the diameter of the vessel, it may be supposed that the stress is fairly uniformly distributed across a section of the material. In order to deduce a general law, we may take any shape of vessel whatsoever; that shown in Fig. 82 will do. Imagine the pressure of the fluid inside before and after strain is shown. Any ordinate to be p lb. per square inch; then, since the fluid is at rest, it will press normally on the confining sur-AB, and this elongation divided by AB is the , face everywhere. To find the strength of the shell

of the vessel to resist bursting at any plane B C. we may imagine the vessel resting on a waggon with infinitely well-oiled wheels, and a smooth road. If we imagine a closely fitting door to be placed across the vessel at B C, it will not alter the equilibrium of the forces inside. Now intagine the vessel cut completely through just to the left of B C, and the left-hand portion of the vessel removed; the remaining part will not tend to move. This will readily be conceded on a little consideration. It is evident, then, that the total force on BC to the left must balance the total force on BDC in the opposite direction.

Let the area of the door B c.be A square inches. then the total force on it (at right angles to its surface) is Ap lb., which must be the amount of the total force acting in the opposite sense on the irregular surface B D C. Hence, we have obtained the total force tending to praduce bursting at the section Bo; it is the area of the vessel in that plane in square inches multiplied by the finid-pressure in lb. per squaro inch; and our conception of a door. is no longer necessary, as it only helped us to obtain the total resultant force to the right on the irregular surface B D C.

What is the total force resisting bursting? Let a square inches he the area of metal which would be laid bare by fracture at the plane BC, and ft the ultimate tensile stress of the metal; then the total force resisting bursting is $a \times f_i$ lb. These total forces must balance each other, or

 $Ap = \sigma R$ which is the general law for the strength of a thin

shell subjected to fluid-pressure inside. Tho strength of any such vessel, then, is calculated '

from the rule-

The area of the ressel in the plane of fracture in square inches, multiplied by the pressure of the fluid in pounds per square inch, is equal to the area of the enctal which would be laid bare by fracture in that plane multiplied by the greatest stress the material will stand in pounds per square inch.

If we want the vessel to resist the pressure safely, we must use safe instead of



be neglected. First of all, suppose the boiler to burst longitudinally-i.c., one end of the boiler to be blown away from the other-leaving the fractured metal

bare at such a section as ACB (Fig. 83). Let the boiler be d inches in diameter, and the shell t inches thick; then the area of the vessel in the plane ACB is.

 $\frac{\pi}{2}d^2$, and the area of metal in the same plane πdt square inches. If p is the pressure of the steam or other fluid inside in lb. per square inch, and f the nltimate or safe tensile stress of the metal, according as the pressure of the fluid is to be that of bursting or safety, our general rule becomes-

$$\int_{4}^{\pi} d^{2} = \pi dV,$$
or $pd = 4V$;

or the pressure the boiler will stand is

$$p = \frac{4tf}{d}$$
.

Now consider the strength of the boiler to resist bursting laterally-i.c., bursting in which the top of the boiler is blown off. Let the boller be I inches long; hence the area of the vessel is in this case ld square inches, and if the ends are neglected the area of the metal is 2lt'square inches, the strength rule becoming --

$$tdp = 2tf$$
,
 $\delta r_p d = 2tf$.

The pressure the boiler is capable of standing when its strength in this direction is considered is

$$p = \frac{2t}{d}$$

It will be observed that this is only half the pressure the boiler will stand before it bursts longitudinally; 'hence, it will burst . loterally. and we will never have the chance of testing the accuracy of the other rule. At any inclined section the strength is something between the two, but the latter is the rule to be employed, as it gives the strength of the boiler at its weakest section, which is what we want.

For a spherical boiler the most likely plane in which bursting will take place is a diametral plane, its area being "d2 square inches; the area of fractured metal is wilt square inches, and the

$$\frac{\pi}{4}d^2p=\pi ddf$$

strength rule is

the same, as for a cylindric boiler bursting at a section at right angles to its axis. In these rules the weakness introduced into the shell by the riveting of the joints is not considered. These seams weaken the shell to a certain extent, and the result is much the same as if the safe stress of the metal were reduced in a certain ratio:

The rules just given may be used for finding the strength of pipes if the pipes are very large in comparison to their thickness. Such pipes are usually of cast-tron; and as it is very difficult to ensure that a cast-tron pipe shall be of exactly the same thickness of metal, it is usual to add to the thickness obtained by this rule, a certain amount which is determined mainly from experience. In a section of thirty pipes or orylinders, the stress.

is not uniformly distributed across a section from the inside to the outside of the pipe, and the question of the strength of such a section is rather complicated. Perhaps the best suic for the strength of such pipes is the following—

 $p(D^0 + \delta^0) = f(D^0 - \delta^0),$ where D is the external and δ the internal diameter

of the pipe in inches, p and f baving the same meanings as before.

. 1. A cylindrio vessel is 8 feet in diameter, and the metal is \$ inoh thick; find the greatest fluidpressure it will bear inside, the safe tensile strees of the metal being 10400 lb. per square inch. Answer, 1805 lb. per square incb:

2. If the greatest safe steam pressure in a cylindrio bolke, 6 feet 5 luebps in diameter, is to be 120 lb. per square sinch, and the strength of the styceed joints 58 of that of the pintes of which the beller is made, the safe stress of the plates being 5 tons per square inch—find the proper thickness of metal.

8. Uning the rule for boffers, and the "bead," of vater which will be brone by water-mains A feet in diameter and 1 look thick, the safe attess of the menth being 800 lb, per a govern inch, and 2 hold beautiful and 1 hold beautiful and 1

4. Find the bursting-pressure of a spherical boilor of feet in diameter, the thickness of metal being a look, and the ultipute stress of the metal 50700 lh per square inch; it being supposed that the joints diominish the strength of the shell 25 per

oem. Answer, 1056 lb. per square Inch.
5. In hydraulio mains the pressure of the water
is 700 lb. per square inch the safe tensile stress of
the metal 3000 lb. per square inch, and the internal
diameter of the pipes 6 inches; find the proper
thickness of inctal, using the rule for third cylinders,
Answer, 96 inch.

STRENGTH OF SHAFTS.

When a shaft transmits power it is twisted; in fact, if a straight line be drawn on the shaft

parallel to its axis whin the shaft is unstrained, this line becomes a spiral which the shaft framemits power. If we imagine the shaft to be twisted only, or subjected only to torsion; the strain is shearing; and the student may, by constructing a little shaft of pennies and then turning cache of them relatively to the next, get an idea of what taken place in a shaft. In Fig. 38. a boost portion of a shaft is shown, and

we may consider what happens to it is a state of all cognidering a little column fit title even each of all cognidering a little column fit is the few each of all cognidering a little column fit distance agant. Since colon, with offer models we may empowe the said of the

hand section to remain fixed, the other end moving round in the arc of a circle, about s as centre, under the

action of the torque applied to be shift. The argin more through relatively to a is the Thé argin more through relatively to a is the like column by a square through relatively to the Hilbs column by a square through a the a to a the greatest and a considerable and a the greatest and of the little column. The moment of the free about the courte of the attention. The moment of the free about the courte of the attention a is a a-square through the a-square a-square through the a-square a-square through the a-square a-square a-square a-square a-square a-square a-square a-square a-square a-squ

The applied twisting-moment, or torque, we may denote by M. We have at once therefore the

(i) Mr = Zfar.

The distance moved by the end of the little

column is a mars, and shear strain is

Distance moved 11

Hooke's law tells us that—

Shear stress = N × shear strein.

Shear stress = Nrc.

Shear stress = Nrs.

We have represented shear stress by f in equation
(1) above, but we can now put for f its value Nrs.

which gives us—

Mt = 2Nr6s × r

= 2Ns6r = N62sr

An expression similar to Nare has been already explained. It is the moment of inertia of the section about the axis from which r is measured.

(2) Mr = Not.

which is the law for the stiffness of a shaft; I for a circle (which is the shape of the section in this case, and in the case of most shafts) about a line through its centro perpendicular to its plane is

32, # being the dinmeter of the circle.

The law, therefore, becomes—
$$(2a) \quad \theta = \frac{n_2M_2}{\pi N_1 d^4}$$

which will be best understood if read as follows :-The angle of tweet in unit longth of a cylindric shaft of diameter d inches, when subjected to a twisting moment of M₁ pound-inches, is equal to 32 times the tristing moment dicided by the product of n, the fourth your of the diameter and the modulus of

rigidity of the material. For hollow cylindrio shafts $1 = \frac{\pi}{32} (D^4 - d^4)$;

hence, the rule becomes, for such a shaft—
$$\theta = \frac{n2Mt}{\sqrt{(1^2-4t)^2}}.$$

D being the external and d the internal diameter. The rule for the strength of a shaft is now easily obtained We saw that the greatest shear stress on our little column is Nr0, or f. = Nr0, where f. is the proof or safe shear stress of the material, as required. This may be written $\times \frac{d}{d\theta} = f_{\theta}$. Put into

this for 0, its value as given in equation (2a), and $\times_{\alpha}^{cl} \times \frac{n_2M_f}{-N_cH} = \Lambda_c$

(8)
$$M_t = \frac{\pi e^2}{10} \rho_t$$

from which-

which is the rule for the strength of a solid cylindric shaft subjected to torsion only. In hollow shafts it becomes

$$M_L = \frac{\pi(D^4 - d^4)}{10D} f_{a}$$

which means that a solid cylindric shaft, d inches in which means that a solid cylindric shaft, d inches in diameter, will stank a torque of a, posud-inches, plying s, the third power of the diameter, and the proper shear stress of the material together, and dietding the product by 16.

These rules cannot, however, be assumed to hold

for stresses which exceed the clastic stress of the material.

From this it is not difficult to deduce a practical rule for the diameter of a shat, which will safely transmit a given horse-power at a given speed. We have already seen (p. 150) that if a torque of T pound-feet acts on a shuft revolving a times per minute. the horse-power transmitted is given by the rule:-

$$H\Gamma = \frac{T \times 2\pi\pi}{10000}$$
, whence $T = \frac{20000}{2\pi\pi}$.

In this lesson we have used the symbol M, to represent torque, or twisting moment, in penulinches; hence,

$$T = \frac{M_f}{12}$$
, or $12 \times T = M_L$

Putting this value of M, into rulo (3), and taking 1000 lb. per square inch as the safe shear stress of a wrought-iron shaft, we have-

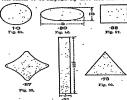
from which
$$\frac{12 \times 32000 \times 111P}{2\pi n} = \frac{-77 \times 00005}{16}$$

$$47 = \frac{12 \times 22000 \times 16}{2 \times 11414P} \times 0000 \times \frac{117}{n}, \text{ or } d = 5\cdot20 \times \sqrt[3]{\frac{117}{n}},$$

which may be taken as-

a = 33 \ \ \frac{1112}{21}

This is a very important practical rule. Taking the safe-working slear stresses of cast-iron and steel shafts to be respectively 4500 and 12000 lb.



Pig. 80. er square inch, we get the coefficients 41 and 3, instead of 33 for the rule just given, when that rule is applied to those materials. Remember these rules assume that the shaft is twisted only.

In the foregoing we have dealt only with cylindric shafts. If a right section of the shaft is not circular, the theory on which these calculations are based does not hold; in fact, a section which was plane being taken as unity. Sir William 'Thomson', has given a beastful hydrodynamic illustration of the way in which the stree varies as various plains on the boundary of a socion. If, we imagine a thin box made of the cauch shape of the shaft, and filled with a friction-less find, then if the foot is additunly rotated about its ratio, the valletief of the first claim to the cat any spoint oppresents the sheer street is a shaft of a saidler along when britted.

In most non-ofreniar sections, it will be seen from this rule that the stress at any point on the surface . of the shaft is greatest nearest the centre.

EXPERIMENTAL ILLUSTRATION OF THE LAWS OF

The layer of the strength and stiffness of syllarification white or write same by illustrated in the following way—Ln Fig. 71 is which as represented as gripped to the product of the strength of the strengt

the angle of twist is successes, proposed modulus of rigidity of the stuff.

In the first part of the experiment—or, indeed, in any of the three parts—it is easily seen that the angle of twist produced by any twisting moment is proportional to the length of wire considered.

Combining those results, we have the experimental law that $\delta \omega \frac{M_s^2}{N d^2}$; and it will be seen that this role agrees with that deduced from theoretical considerations, and given in equation (2a).

", "Proceedings, Inst. C.R., 1890," Part-III. pl. 270.

If wires of different diameters, but the same in other respects, are tried, it will be found that the twisting moments necessary to produce permanent set are proportional to the cubes of the diameters



of the wires. This is an illustration of the strength rule given in equation (3).

rule given in equation (3).

If whree of other than olcoular section are tried,
it will be interesting to note where the material
first begins to give way. This is a useful experiment, and not only illustrates the theoretic laws,
but shows that those laws—as they ought to dospply equally to this wayes or to large shafts.

PRACTICAL, CONCLUSIONS AND EXAMPLES.

From, wheat hese been given you can now in a position to cove out merial examples on the strong, it should be borne in mind, however, that shartes in proclose are subjected to heaving as well as twisting, owing to the leads due to the weights of pulleys and palls of bolts.

Space does not permit us to go, into this matter fully, but we may give the result, which is that the diameter of the shaft has, to be intercased by an amount depending on the amount of bending which the shaft has to withstand.

Thus, if the practical rule for the diameter of a wrought-iron shaft is $n = 33 \frac{5}{3} \sqrt{\frac{HP}{4}}$ when torsion

only is considered; it will be $d = \sigma \times 3.3 \sqrt[3]{\frac{118}{3}}$ when bending is taken into account. Some values of σ are given below —

Kind of Shift.	Value of c.
Propeller shafts of steamships, and shafts with a singler load the shafts in mills, etc. Grands shafts and shafting subjected to shocks, a sand a shaft and shafting subjected to shocks, a sand machine to the shafts are said said.	1·13 1·3 1 42

If, then, you wish to take bending into account, instead of using the rule-

$$a = a \sqrt[8]{\frac{HP}{n}}$$
, where $a = 3 \cdot 3$, 4 \cdot 1, etc.

take the rule— $d = e \times a \sqrt[8]{\frac{HP}{n}}$

This, if a shaft is required for a mill or factory, if not subjected to excessive shooks or more than the usual amount of bending, its diameter (if it is of wrought-fron) would be found from the rule—

$$d=1.3\times3.3\sqrt[3]{\frac{\overline{HP}}{n}}.$$

The following examples should be gone through carefully:—

NUMERICAL EXAMPLES

In the following examples the shaft is supposed to be subjected only to torsion.

1. Find the safe diameter of a wrought-iron shaft to transmit 60 horse-power at 120 revolutions per minute.

limite.
The rule is
$$d = 3.3 \sqrt[5]{\frac{11P}{n}} = 8.3 \times \sqrt[5]{\frac{50}{120}}$$
 in this case,
 $= 3.5 \times \frac{5}{5} \sqrt{2} = \frac{5.9}{120} = 2.62$ inches.

 A wrought-iroh shaft 3 inohes in diameter rotates 160 times per minute; what horse-power will it transmit with safety?

Since
$$d=3.5$$
 $\sqrt{\frac{11P}{n}}$, $\frac{d}{d} = \sqrt{\frac{11P}{n}}$ or $\frac{d}{(3-9)} \times n = 11P$; from which the horse-power in this case is—
$$\frac{27 \times 1190}{80 \times 607} = 112.7.$$

3. If a shafe transmits safely 100 horse-power at the speed of 150 revolutions per minute, what power will it transmit with safety at 200 revolutions per minute? Answer, 133; horse-power 4. Find the twisting moment necessary to pro-

Find the twisting moment necessary to produce, in a wrought-iron shaft 1½ inch in diameter and 12 feet long, a twist of 12 degrees.

If this shaft revolves 150 times per minute, what horse-power will produce the same twist?

A twist of 12° in 12 feet is a twist of 14° in 1 inch, or $\frac{1}{12} \times 0175^{\circ}$ radian in 1 inch.

The rule for the stiffness of a shaft is

 $\theta = \frac{32M}{\pi N d^{4/3}}.$ whence, in this case, since $\theta = 0.0146$,

M_f = 00146 × 3 1416 × (1 5)+× 105000000 34 = 7610 pound inches.

The second part of the question is solved by the ule—

Torque (in lb.-ft.) × angular velocity in radians per-initiate

- 50000 = horse-power.

Answer, 18-03 horse-power.

Answer, 18-03 horse-power.

5. Will the twisting moment found in the last example be too great for the shaft to transmit with anfety, the safe shear etrees heing taken as 9000

example be too great for the shaft to transmit with anfety, the safe shear etress heing taken as 8000 lb. per square inch ? Answer, Yaf. 6. A solid optication shaft is 5 inches in diameter; flud the external diameter of a bollow shaft of the same material, the internal diameter of which is!

same material, the internal diameter of which is, two-thirds of its external diameter, and which shall have (a) the same strongth, (b) the same stiffness, as the solid shaft.

By equating the expressions for the strengths of a hollow and a solid shaft, we get the

a hollow and a solid shaft, we get $\frac{D^2 - A^2}{D} = \delta^2$;

where D and δ are respectively the external and

internal diameters of the hollow shaft, 5 being the diameter of the colid one.

The rules for stiffness give us the condition—

D'-d'= 8'.

Answer (a), D == 5.38 inches.

(b), D == 5.28 inches.

In solving the following examples, the rules which allow for bending as well as twisting are to be taken.

I. Find the diameter of a wrought-iron mill-shaft, to transmit 250 horso-power at 200 revolutions per minute.

Answer, diameter 4:62 inches.

2. A wrought-iron brank-shaft is 6 inches in diameter, and rotates 96 times per minute; what horse-power will it transmit safely? Answer, 2016 horse-power.

Find the diameter of a solid steel propeller.
 The number of degrees in any angle × 150 (which is approximately 0175) gives the number of radians in the shade.

shoft to transmit 12000 norse-power at 80 revolu-tious per minute. Answer, dlameter 18 inches. 4. If the shaft in the last example is to be hellow, find its external dinmeter from strength considerations-(a) when its internal dian three-fourths of its external diameter, (b) when its internal diameter is two-thirds of its external

Note. - For hollow steel shafts subjected to torsion only, the strength rule simplifies to $\frac{\text{up}}{\text{u}} \times 26.5 = \frac{\text{D}^4 - d^4}{\text{D}}$. For wrought-iron shafts, ose 35-66 instead of 26-5. If bending is taken into account, multiply the horse-power by co. Answer (a), D = 20 inches.

" (b), p == 19-26 inches. 5. A steel shoft in a certain machine-tool ins to transmit, 10 horse-power at 100 revolutions per

minute; find its proper diameter. Answer, I 97 inch.

MINERALOGY .- V. . . [Continued from Pel. PIL. p. 856.] DESCRIPTIVE MINERALOGY: CHLORIDES, ETC., OXIDES, OXYGEN SALTS,

3. CHLORIDES, FLUORIDES, ETC. ROCK-SALT, or holite (NaCi), sodiom citioride, is soluble in water, decrepitates, and burns with a veliow flame. It crystallises in the Cubic system. in oubes or in hollow "hopper-shaped" orystals. It is transparent, very perfectly disthermous, and vitreeus. µ=1.49. In colour it varies very much, being colouriess when pore, bot usually reddish or orange, from the presence of iron, violet or blue. Its taste is saline. H=2. G=2.2. It occurs in beds of various geological age and often of greet thlokness, associated with gypsum; and on the shores of inlund seas. Cheshire, Droitwich in Woreostershire, Wieliezs in Austrica Poland, and Stassfurt in Saxony are among the chief localities.

· SYLVINE (KCI) · the corresponding potassium sait, is isomorphous with rook-ealt, differing mainly: in giving o violet flame and having u rather bitter . CERARGYRITE '(AgCi), EMBOLITE (SAgCi + 2AgBr), and some related compounds are known as hern silver, from their pearl-grey colour and resinous lustre. Though crystallising in the Cubic system, they are more often massive. H = 1 - 2. G=5.5 - 6. They are worked as important silver

ores in Chili and Mexico. Pruon (ChE₂), calcium fluoride, is the Blue John calcassively used as plagments.

or Derbyshire spar of miners. It decorphates,
Prudialskog (UULQ), the oxide and chiefphosphoresses, and with microcosmic act or source of uraintum, which is used in studing glasse.

sulpburic acid gives off fumes of hydrofluoric neid (HF), which each glass. It trystallises in cubes, and is transparent, vitrous, and fluorescent.

1-436. Yu colour, though most commonly violet or green, it may be colourless, yellow, or red. H == 4 G == 3 - 3 1. It is a common veinstone, associated with galena, in the smelting of which it was formerly used as a flux, whence its name. It is also used for ornamental purposes and for etching

CRYOLUTE (SNaF + AlF2), the dooble fluorido of sodium and aluminium, derives its name, which signifies "ice-stone," from its white colour and extrome fosibility. It melts in a condle fame, colouring it yellow; becomes blue on the odds ion of cobolt nitrate; and with sulphuric acid gives off hydrofluoric soid. It crystsilises in the Prismotic system, but is usually laminated. H = 2.5. G=3. It occurs at Arksut-flord in West Greenland in a vein in guels, and was until intely the sole commercial source of the metal aluminium.

4. OXIDES

CUPRITE, or raby copper (CugO), ah important ore, is fusible, giving a green flame ond a copper bend in R.F., and disselves with offervesoence in nitrio acid. It orystallises in the Cubio system, ofton in ociahodra, is translucent, adamantine, oochinest-red, blackening on exposure, and brittle. H == 3.5 - 4. G == 6. It occurs in Cornwell; at

Chessy, near Lyons; in Citii, Peru, etc. "STINEL (MgOAi₂O₂), a speeles lie lidling some precious stones, is infusible, bot is soluble in strong soiphuric acid. It crystallises in the Cubic system rally is octahedra, and is vitreous. H=7.5 -8. G=35-39. The red variety is the ruby, or spinel ruby, of watermakers; the rese-coloured, the balas ruby ; the orange, the rublcolle ; the violet, the almandine ruby; the black, plequaste.

MAGNETITE or lodestone (FeOFe, Og), the richest and most valuable ore of iron, of which it coutains 72 per cent., though uscoily in amorphous masses. is isomorphous with spinst, occurring in octahedra, often large ond very regular. It is metallio and black, with a black etreak, and is very magnetic. H=55-65. G=5. It fuses with difficulty, gives a bottle-green borax-bead in R.F., and is soluble in hydrochiorio acid. It occurs associated with the crystalline sehists in Norwny, Sweden, Lapland, and Siberia.

CHROMITS, the corresponding exide of chromians und irou-(FeOCr.Os), whileh is also isomorphous, is the chief source of the chromium salts which are

of a yellow or black colour, is named from its black colour and pitch-like lustre. H=55. G= 65. It occurs at Joachimsthal, Bohemin, and elsewhere.

CHINKODERIX. (BEOALQA), the oxide of beryllium and aluminium, a species including the geims orizatal chrysolitic (greenish-yellow), alexandrite (green by day, red by lamp-light), and cymophane (chatoyant), crystallises in the Prismatic system, often in sixsided and stellate twins. It is very infusible and unaffected by acids. H = 95. G = 37.

CORUNDUM (ALO.), alumina, or aluminium sesquioxide, gives a colourless borax-bead, becoming blue with cobalt-nitrate, and is unaffected by acids. It erystallises, as do most anhydrous sesoui-oxides, in . the Hexagonal system. It is transparent or opaque. and vitreous. $\mu=1.76$. H=9. G=4. The pure colourless variety is the lux or mater sapphire; that exhibiting a six-rayed opalescent storin the direction of the morphological axis is the asteria or star samphire : the blue, the samphire : the red, the true or oriental ruby : the violet, the oriental amethust ; green, oriental emerald; yellow, oriental topas; brown and opaque, corundum ; black, emery. The : term "oriental," distinguishing these stones from spinel, amothystine quartz, beryl, and ordinary topaz, now only implies excellence and not place of origin. Sapphires come mainly from Ceylon; rubics, from Burma; corundum, used for polishing, from Ceylon and Canton; emery, similarly employed, from Naxos and Asia Minor. The sapphires of various colours are the most costly of gems.

HEMATITE (Fe.O3), a valuable iron-ore, gives a green borax-boad in R.F., and is slowly soluble in warm hydrochloric acid. It orystallises in the Hexagonal system, orystals with splendent metallic lustre, such as occur in Elba, being known as specular iron-ore from having been used by the Romans as hand-mirrors. It is often in reniform. mammillated, or botryold masses, with a radiate, fibrous structure, known as kidney iron-ore, or may occur as a red earth known as red ochre or reddle. Homatite is metallic and black ($\mu = 3$), but has a cherry-red streak and appears red in very thin slices. It is slightly magnetic and a conductor, H=6, G=5.2. It occurs in hollows in the Carboniferous Limestone, at Ulverston in Lancashire; in vast. masses in Missouri, and near Lake Superior and elsewhere.

ILMENITE (FeOTIO₂ + Fe₂O₃), or menaccanite, an oxide of iron and titanium, with crystalline form and angles almost identical with hematic occurs in scales and as sand, and in eruptive and metamorphic rocks in the Ilmen Mountains in Orenburg, at Menaccan in Cornwall, and elsewhere.

The hydrated sesqui-oxides of iron include

GÖTHIFF: (Fe.Q.; + H.Z.), named after the poet foothe, who was also an innerniogist, which occurs in yellow, red, or brown crystals 'bolonging to the Prismatic system, and the earthy Tupnarza (20F.Q.; + H.Q.), a red other, Linkoutrz (2Fe.Q.; + H.Q.), a red other, Linkoutrz (2Fe.Q.; + H.Q.), a red other, and shown other, and there contain about 6, 15, and 25 per cent. of water respectively.

BEAUXITE, or Bauxite, named from a place near Arles in France, is a hydrous oxide of aluminium and iron (3Al₂O₃ + Fe₂O₂ + 2H₂O), and is used in the manufacture of aluminium.

PRILOMELANE, named from $\psi_{AB_{p}}$ quites, smooth, and $\psi_{AB_{p}}$ quites, smooth, and $\psi_{AB_{p}}$ quites, since, is an earthy mineral containing from 70 to 80 per cont. of oxides of manganeses, sometimes as much as 1 per cent. of variet. It is a common or of manganese, $H_{B=5} = 0$. Ge of manganese, $H_{B=5} = 0$. Ge of manganese, is a more by defined substance is a more by defined substance.

PRIOLUMITE (MIO₂), the most important ore of mangames, of which it is commonly termed the "black cotide," is the first of the dioxide series. It is given a violate break-band in $O_{\rm T}$, and is soluble in hydrocalization of action of the prior of

CASSITERITE, or tinstone (SnOc), is practically the sole source of tin. It is fusible with soda in R.F., but is unaffected by acids. It crystallises in the Pyramidal system in right square prisms with pyramidal ends, and in many twin-forms. It is adamantine, black or brown, and brittle. Tinstone has been mined in Cornwall for ages. The great mariners of the ancient world-the Phænicians-dared to pass the Pillars of Hercules, and come to Britain for this ore. It is found in small quantities in Saxony, Austria, and Finland; but in Tasmania, the Malay peninsula and archipelago there are extensive? deposits. The island of Banca is almost wholly composed of it. When a district in which tinstone occurs is eroded by a stream, the water acts upon the ore as upon rocks, wearing down small pieces of it, which are found in the bed of the stream. like gravel and are called stream-tile. H = 6 - 7. G = 6.5 - 7.1

ZIRCON (ZrO₂ + SiO₂), the dioxide of zirconium and silicon, is isomorphous with cassiterite, but rarely twinned. It is colourless or vellowish the cicar specimens being the gems known as jargoon H=75, G=47.

RUTHL, ANTASE, and BROCKITE are, identical in composition, being all titanium-dioxide (FQ) but ruttle is Fyramidal, often account and penetrating quarte, has a 'hardcess of 61–65' and a density of 42, whilst, has a 'hardcess of 61–65' and a density of 42, whilst, anatase' orystallises in a distinct series of forms of the same system, has H=55-6 and G=38-89, and brockite is Friamtic with H=561-6 and G=38-89. These minorals, therefore, form an interesting example of polymorphism.

Last and perhaps most important of the oxides are those of silicon, especially Qu'arrz (SiO₂). These, lowever, being important took-forming minerals, have been sufficiently described in our lessons on Geology (Vol. III. pp. 100, 175).

5. OXYGEN SALTS I. Carbonates.

So too the chief carbonates, CALCITE, ARAGONITE, DULOMITE, and CHALTBITE, have been already described (Vol. III., p. 178). Besides these must be mentioned the Rhombohedral CALAMINE (ZnCO₃). one of the chief ores of zinc; and the Prismatic CERUSSITE (PbCOa), or white lead ore, a decomposition-product of galena. WITHERITE (BaCO.) and STRONTIANITE (SrCO.), both used in refining sugar, from their high specific gravities of 4-3 and 3.5, were formerly confused with the sulphates of barium and strontium under the name "heavy spar." MALACHITE, generally in stalagmitio forms, is the green carbonato and hydrate of copper (CuCO. + CuH_O_); and AZURITE or CHESSYLITE (2CuCO. + CuH-Oa) is a deep blue mineral, often associated II. Silicates.

By far the most-varied and complex group of minerals is that of the silication. Their obsencion composition can often not be expressed in a formal, or, if so expressible, only by one which the student can hardly be expected to carry in his memory. Beyond their purely scientific interiest most of the species, partly, from their infessibility, are more important us constituents of the crystalline rocks than for uses in the arts. In elementary lessons, such as these we can, therefore, only briefly supplement what we have already said of them (Vol. III., pl., IT-35) some notes, theirly on the valued of the property of the control of

OLIVINE, when yellowish green, is known as obrygolite, and when pistaclifo-green, as peride.

ASBESTOS is hornblende in slender fibres, which are easily separable. Usually it is white, but occasionally green. It is noted for its resistance to fire, and is used in gas stores for the fame to

play against. It may be weven into fabric, which is sometimes used as a covering where fire is to be resisted. Menntain leather and menntain ore? are that varieties of the same material. It would seem that the main difference between augite and horn-blander requist from the manner of the cooling of blander requist from the manner of the cooling of constituent of the cooling of the more modern is grooned recip, and angue of the more modern is grooned recip, and angue

CROCIDOLITE, a silicate of iron and sodium, the fibres of which are enclosed in the groen quartz "onts-eyes" of South Africa, and the tough noncrystalline green substance JADE, a silicate of magnesima and calcium, with S.G. =2°9 or 3, used from prehistorio times for circumofall weapons, are related to the augites and hornblendes.

Toyaz is a silicate of niumintum, related to modalustie, but containing 15 to 17 per cont. of fluorine. It crystallises in the Prismutte system with perfect behand cleavege, and is generally hemilicated and pros-electrine. H=8. G=26. The located and pros-electrine H=8. G=26. The located has come Draul Hocomo Junk when hearded. He had to the property of the propert

STAUEOLITE, which occurs in the spotted schists, is named from its cruciform mades, which belong to the Prismatic system. It differs from andalmsite-in containing silicate of iron, and is often dark-coloured.

KYANITE, identical in composition with andalustic (Al₂O₂SiO₂), and occurring in the same way, differs in its long anorthic crystals, and is often light blue.

DICHROITE, a silicate of aluminium, magnesium, and iron, the *telite* of sapkir doan of jewellers, is also Prismatic and blue, but dichroic.

CARBUNCLE is simply a jeweller's name for a dark-red garnet cut en cabochon, i.e., rounded, without facets.

Related in composition to the felspars are lengite and nepheline, often important ingredients of rocks.

LEUCITE, a potassium-aluminium silicate, occurs in regular ioositeirahedra, often large, and white or grey, which are now known to be Pyramidal at ordinary temperatures, but to become Cubic when heated. Showers of them are thrown out by volcanoes,

 NEPHELINE, named from its clouded appearance in nitric acid, is a Hexagonal aluminium, sodium, and potassium silicate, characteristic of phonolite.

BENYL, the silicate of aluminium and beryllium (otherwise called glucinum), crystallises in Hexagonal prisms, often very large, occurring in granites and other crystalline rocks. The bright green variety, emerald, is brought especially from Muzo in New Granada. The pale bluish-green variety is agramarine. H=7.5-8.~G=2.7.

HAUYND, named after Hady, is a silicate of aluminium and sodium with calcium sulphate, occurring in small bluo erystals in some lavas. Lapis-lazali, occurring in erystalline limestone in Siberia and Chian, is a rich blue, more opaquo variety, generally massive, used for ornament, but for jewellery. II = 5. Formerly, this stone, reduced to powder, was the ultramarine of the painter-a very expensive colour ; but now the pigment can be produced artificially.

III. Tungstates, Titanates, etc.

WOLFRAM (2FoWO4 + 3MnWO4), the tangetate of Iron and mangane-e, commonly found massive, in association with the ores, as the cluef source of the tangstates of commerce, which are used as ordants in dyeing, to hardon steel or plaster of Paris, and to render stuffs uninflammable.

SPHENE, named from the wedge-like form of its Oblique crystals (Greek spin, sphen, a wedge), is n siliente and titanate of lime, occurring in erystalline

IV. Sulphates and Chromates ANHYDRITE, calcium sulphate, and Gyrsum, the

hydrons sulphate, have already been described (Vol. III., p. 178).

BARYTE (BaSO4), a common velnstone, white when pure, but often sherry-brown, crystallises like the former in the Primatho system. It is used us a white paint. G = 4.8.

CELESTINE (SrSO4), sometimes bluish and commonly associated with native sulphur, crystallises

in the same system, and was formerly confused with baryte, witherite, and strontianite under the name "heavy spar." G == 30.

ANGLESITE (PBSO₄), a white decomposition-preduot of galenn, first noticed in Anglesen, is also Prismatio.

MELANTERITE (FeSO4 + 7H2O). green vitrlol; GOSLARITE (ZnSO4 + 7H2O). white vitriol; and CHALGANTHITE (CuSO4 + 5HaO), or blue vitriol, are similar decomposition-products of pyrites, blonde, and obalcopyrite, more important as artificially prepared than as minerals.

V. Borates.

Bonax, the hydrous biborate of sodium, crystallises in short Oblique prisms, la soluble, sweetishalkaline, and fusible with intumescence, It was originally brought from the shores of a lake in Thibet, the crude salt being known as tincal; but Thibet, the cruce sait using known as a man, is now extensively prepared from the boracio acid lagoons in Tuscany, and from the Borax Lake of California. It is used as a flux, in soldering and in making enamels.

BORAGITE, the borate and chloride of magnesium. is interesting from the relation of its thermo-electric characters to its crystalline form, which is generally the cube combined with the tetrahedron.

VI. Netrates. NITER, or saltpetre (KNO2), though largely prepared artificially, occurs in small white Prismatic crystals in the floors of caves, and as an efforescence on the soil in hot countries. Its saline cooling taste and deflagration are well known. It is mainly used in the manufacture of gunpowder.

NITERATINE, or Chill saltpetre (NanO₂), which occurs over many square inlies of the desert of Atacama, differs in being Rhombohodmi, in having only a cooling taste, and in giving a yollow instead of a voict finme. Though its deliquescence unfix It for gunpowder, it forms a most valuable manure. and is used in preparing nitric acid and nitro.

V11. Phomhates.

APATITE, the phosphate of lime, having been de-cribed (Vol. 111., p. 178), we need only mention here wavellite and turquoise, both hydrous alumininm phospintes

WAVELLITE occurs in small hemispherical group of radiating Prismatle orystals of a duli pearly greenish tint, on the surface of slate or granite

TURQUOISE Is only known amorphous, coming chiefly from Nishapur in Persia. It owes its' blue or green colour to small quantities of copper and . lron, la bleached by hydrochloric acld, and deerepitates, turns brown, and gives off water when heated. Being as hard as felspar and susceptible of a polish, it is valued as a gent.

GERMAN. - XLIII. [Continued from Fol. P.II., p. 380.]

USES OF THE TENSES.

Rule.-The pluperfect tense is used to express what had taken place at some past time denoted by thio context, as :- Radtem tie Conne untergegaugen war, ging er meg, after the sun had gone down, he went off ; er hatte mabrent unferer tluterrerung gefchlafen, he hend alopt during our conversation.

Hule .- The first future tense is employed merely to express what shall or will take place hereafter; while the second future is used to denote what shall have occurred at some future period.

OBSERVATION.-The future tenses, both first and ond, have their precise equivalents in the corsponding English tenses, and should be used accord-

-The indicative mood is used in affirming or denying that which is conceived to be certain or . GERMAN.

undoubted, as :- Gr wirt mergen jurudtemmen, he will return to morrow.

OBSENVATION.—Since the proper office of the indicative is to express reality; it is employed in all absolute or independent sentences. Even in conditional sentences, moreover, it is used, if the condition is assumed as Tact, as:—Sift to mak, for which is the condition is assumed as Tact, as:—Sift to mak, for which is the condition is assumed as Tact, as:—Sift to mak, for which is the condition is assumed as Tact, as:—Sift to mak, for which is the condition is assumed as Tact, as:—Sift to make the condition is assumed as Tact, as:—Sift to make the condition is assumed as Tact, as:—Sift to make the condition is assumed as Tact, as Tact,

Reic.—The subjunctive mood is used when that which is expressed by the verb is conceived to be uncertain, though possible, as:—3d face.gefer, tell or it gesinfers &till refulting 5ds, I have heard that he has obtained the desired situation.

OBSERVATIONS.—The subjunctive, from its very nature, stands chieff in dependent clauses; and in this appears under various circumstances. Thus, it is employed.—

(2) When the design of the speaker is merely to repeat or quote a statement without vouching for its accuracy, as:—Gr metter int, risk, re fig vectoristly sake, he told mit that his had, been married. When, on the contrary, the design of the speaker is to see front his thing prepeate or quoted as something rotation of quoted as something as —Gr will re help slader, let fine short the contrary in the same of the same as the same of the same as the same as

(2) In like manner the subjunctive is used in subobilitate clauses, after anot-verbs as \$\frac{1}{2}\text{end}\$, who hope; firsten, to fair; reinfigen, to wish; restin, to hope; firsten, to ask; ratten, to advise; restinate, to forbid; remaisten, to exhort—since the eyen, in such forbid; remaisten, to exhort—since the eyen, in such cases, may be supposed to be always more-to-be less uncertain, as:—\$\text{eff}\$ effects, this "re &texts" refails, he is arriad that he may be punished.

(3) So also the subjunctive is employed in clauses which indicate an end object, wish, or result, and which are introduced by tag, any tag, tamit, or by a relative, as — Sprin faut, temit, or they writely, speak loud, that he may understand you.

(5) The subjunctive appears also in asking indirect questions, as —3¢ fragte the set mir bas 6th gets. Jame, I asked him whether, he could give me the money. When the question is made directly, of course the indicative is used.

Rule.—The conditional mood is used where a condition is supposed which may or may not be conceived to be possible, as :—Bar io rin, io wire

ich ihm feine Bitte nicht abgeschlagen haben, were I rich, I would not have refused his request.

OBSERVATIONS.—(1) Besides the two tenses ranged under the head of conditional in the paradigms, it must be observed that the imperfect and the pluperfect of the subjunctive are equally often employed in expressing conditional propositions.

(2) Sometimes, in the way of exclanation, the condition is expressed, while that which dependent on it is omitted; in which case the whole expression, being of the nature of a whis or petition; often introduced (in translation) by "oh," "I wish that," and the like, as i—date is yet yet; of which is the property of the property of

(3) Not unfrequently the conditional of the auxiliaries sings, being, figlen, theme, and welfe, is ampliored to render an expression less positive, or to give it is an air of difficence, as:—3g white, or to give it is an air of difficence, as:—3g white, or to give it is an air of difficence, as:—3g white, or to give it is an air of difficence, as:—3g white, or septimized many air of the septimized with a septimized and air of the septimized with a septimized and air of the septi

Rule.—The imperative mood is used in expressing a command, entreaty, or exhortation, as:—Türchte Gett um ehre ten Renig, fear God and honour the king.

OBSERVATION.—Sometimes, by a peculiar ellipsis, the past participle is employed in place of the imperative, as:—Shur night lang giftagt! do not ask long! where the full phrase would be, GR write nur night lang giftagt! let it not long be asked! Un the Urbeit gegangen, off to your work!

Rule.—The infinitive mood, either with or without the particle ga (to) preceding, is used to represent the being, action, or passion in a manner unlimited, as:—Extern if Right, and then use not feter, but if an lingfalf, to die is nothing, yet to live and not to see, that is a misfortune indeed; by Music gales is writte, the wish to be praised.

OBSERVATIONS.—(1) The infinitive without 31 (to)

(a) When, as a verbal substantive, it is made either the subject or the object of a verb, as:—Seten iff feliger, ale Mehmen, to give is more blessed than to receive; has ment or arbiten, he calls that working.

receive; but ment or arbition, he calls that working.

(b) When it stands alone, as in a dictionary, as:—200m, to praise; licen, to love.

(c) After the verbs-ştim, to bid; leffen, to help; iffen, to teach; iffen, to teach; irem, to learn, jêten, to hear; jêten, to sec; jêşfen, to feel; jênen, to find; as:—Bir times naugu, we learn to dance; jê jîfêşt tru Balf şşisken, I feel.his palse beat. The verbs lefter and team form ecopstions to the observation, admitting as they do somistimes the particle 1s - between them and an infinitive succeeding. The student will note also

. 1

that the infinitive after all those verbs is in English often best rendered by a participle, as :-- Gr fühlte (im Blist gahren, he felt his blood builing. (d) After the auxiliaries of wood, magen, formen,

toffen, bürfen, follen, mellen, and muffen, and after merken when employed as an auxiliary in forming the future

(a) After the following verbs in certain phrases, us Miles, to remain; faften, to go in a carriage; grien, to go or walk; balen, to have; fegen, to lay; me to make ; reiten, to ride ; as :- Gr fat gut reten, he has easy talking (i.e., it is easy for him to talk); or made and lades, he made me laugh. Stades, however, cannot as in English he used to signify "to make or cause by force"; thus, to translate the English phrase, "make him go out," the Germans say, 2si

(not made) ibn lingufarben (3) The infinitive with an is employed-

(a) After nouns and adjectives which in English nre followed either by the preposition to with the infinitive, or by a with a participle, as: -30 mer furth the ju feten, I was glad to see him; up bis make, of an born, I am tired of hearing it.

(b) After verbs, to express the end or object of their notion, as :- 34 femme, mit Ihnen gu fprechen, I come to (is, in order to) speak with you; in which case, also, the particle um often comes before 1s, to render the expression more forcible, as: -- Pieter but Togest, um gládich ja fein, love virtue in order (1211) to

(e) After the verbs following, and others of like

import, as :-Unfangen, to begin. Sein, to-be. Befehlen, to command. Bergen, to he wont, Ournor, to suffice. define, to hope. Saubten, to fear Scheinen, to appear. Sid firms, to rejoice. Biffer, to know; etc.

(d) After the propositions ofse (without) and flatt or enflatt (instead of), ns:-- Chee on West ju legen, without saying a word; anfatt an febreites, instead of (3) The infinitive in German, as intimated before;

often performs the office of a verbal substantive. It is then commonly preceded by the neuter of the article, and has all the various cases, as: -34 beakes Gelens mits, I am weary of walking. (4) The infinitive active in German, after certain verba-as, fein, faffen, verbitten, befehlen, etc .- is not un-

verba—as, fitt, telfitt, versiten, higher, etc.—is not un-frequently comployed passively. Thus, esi ijn mfts, which (literally) means "tel him coll," may also signify "let him be colled"; et if teise Site in versitens, there is no time to lose, or to be lost.

(5) The Germans often employ the indicative os subjunctive, proceded by tes, where in English the infinitive, preceded by fo, is used; as: 3\$\text{preceded} \text{preceded}.

er her Mann ift, I know him to be (lit. I know that he

(s) the man. (6) The infinitive in English, preceded by the words hore, where, what, when, and the like, after anch verbs as fell, know, say, and teach, cannot be . rendered literally into German; the Germans, in such cases, always using the indicative or subjunctive of such verbs as false, maifre, Sesses, as -- Septem Gir such, see of logar fest, teach me what to say.

· THE PARTICIPLES.

(1) The participies in German are varied by cases, following the same rules of infliction as the adjec-tives. Having the unture of adjectives, the present in a few, and the preterite in many instances, readily

ndmit the degrees of comparison.

(2) The use of the participie as such however in German is far more restricted than in English; for in English it is commonly used to form a distinct clause of n sentence, and is thus made to indicate the time, cause, or means of effecting that which is expressed in the main clause; thus we say, "Walking (that is, by or when walking) uprightly, we walk sureiy." This mode of expression can rurely, if ever, he adopted in German, in which language—if we desire to translato the above sentence-

Benn mir anfrichtig wenteln, fo wanteln wie ficher, that is, when we walk sprightly, we walk surely. (3) So, too, we say in Boglish, "Haping given him the money, he went away"; but since there is nothing the money, he went away ; our since there is an among in German to correspond to this English compound participle, it would be a gross error to attempt to render the sentence literally. Recort must be had. as in the other case, to a different structure, thus:-Mis er ihm bet Gelb gegeben batte, glug er weg, that in, after or shes he had given him the money, he went away. In this way must all cimilar cases be managed; we must employ a verb in each clause, and connect the two together by means of suitable conjunctions,

such as well, were, aft, ba, and interes. Rule.—The present participle, like an attributive adjective, agrees with its noun in gender, number, and case; and may also govern the same case as the work whence it is durived, as :-- Dri topent firshing, the smiling spring; his elfet believes Sens, the allanimating sun, i.e., the sun that unimates oil.

OBSERVATIONS.-(1) This participle is seldom, if over, otherwise employed with a noun than in an attributive sense. Its predicative use is found almost altogether in those words that have so far lost character as participles as to he commonly recognised only as pdiegtives, as :--- Reigns, charming; fedsfree, mortifying; brident, oppressive; firfest, flowing; etc. Such combinations, therefore, as I am reading, see are walking.ctc., so common in English, are wholly inadmissible in German.

. (2) The present participle, in connection with the article, is often used substantively, the noun being understood, as:—Der lefente, the reader [lit. the (one) reading]; bir Sterbente, the dying woman

(3) This participle, however, cannot in German, as in English, be by means of an article turned into un abstract verbal noun.' But in order properly to render such phrases as the reading, the writing, into German, we must use the present of the infinitive; thus :- Das Lefen, bas Schreiben.

(4) The present participle, as stated in the rule, may govern the case of its own verb; but it must be noted that the word so governed always precedes the participle, as :- Das uns perfolarate Gefdid, the as pursuing fate, i.e., the fate that pursues us. In some instances the words are actually united, forming compounds, as :- Chelicient, honour-loving-that is,

ambitious. (5) The present participle is sometimes used with the significance of an adverb—that is, to express some of manner or condition, thus :-Weinest freach er ju mir, weeping (that is, weopingly)

he spoke to me. Aula.—The preterite participle is not only used ...in the formation of the compound tenses, but may ulso be construed with nouns, like adjectives, as :-Cin geliebres Rine, a beloved Child.

OBSERVATIONS. — (1) This participle, in its character as an adjective, is far more frequently employed in German thun in English. Indeed, many preterites in German, having lost all characas participles, are now used exclusively as

(2) The preterite, like the present participle, is sometimes used in an adverbial manner, thus :- Das Buch ift verferen gegangen, the book is lost (lit. gone · 'r lost).

(3) This is ospecially the case with certain parti-eigles omployed with the verb temmen, as:—Gr fount scittes, he comes ridden (that is, riding on horseback). (4) Kindred to this is its use, whon connect with a verb, to express the condition or state of the

subject, as :- Best first ich beruhigt, now.I die content; in feine Augend schällt, tropt er ber Berkumsung, wrappod in his virtue, he defles calumny. (5) The preterite participle; usually in connection

. with the acousative, is in some phrases employed absolutely, as :- Die Hugen gen himmel gerichtet, his cyes · being directed towards heaven; ben Gensian abgerechnet, . the profit being deducted. (6) This participle is sometimes elliptically

employed for the imperative.

Rulo.—The future participle is, used when the subject is to be represented as a thing that must

or ought to take place, as :- Gine in lobente That, a deed to be (i.e., that ought to be) praised.

OBSERVATION.—What is called the future parti-

ciple in German is produced by placing au before the present participle, as above. It can be formed from transitive verbs only, and is always to be taken in a passive sense. 'It is oblefly to be found in the case of compound verbs, thus :-- Computerenter Octohighly-to-be-honoured (i.e., honourable) Sir.

THE ADVERBS.

Rule.—Adverbs qualify verbs, participies, adjectives, and other adverbs, as :- Gr bat ten Gegenflanb vertrefflich behantelt, he has treated the subject admirably.

OBSERVATION. -- Almost all adjectives in the absolute form are in Garman employed as adverbs. (For remarks on the position of adverbs in sentences see the section on the arrangement of words.)

COLLOCATION OF WORDS.

(1) In the arrangement of words in sentences the German differs widely from the English. Many differences of collocation, accordingly, have already been noted and explained in various other parts of this work. But as every word and member of a sentence in German takes its position according to a definite law of arrangement, and cannot, without great offence ugainst oupliony, be thrown out of its proper place, we subjoin here some general instructions on this topic.

(2) The essentful parts of every sentence, as (3) And selection pairs of every sentence, its already remarked, are the subject und the predicate. That which is used (properly, some part of the verb of existence, fein) to couple the subject and the predicate, is called the equite. Now, arranging these three parts in their entirel order, the subject was the predicate, in the predicate, in the predicate, is called the equite.

will come first, the copula next, the prediente last; thus:--Das Bferb war Bart.

The horse

was (3) When, as in the case of simple tenses, the copula and the predicate are both contained in a single word, that word holds the place of the copula. For example:-

SUBJECT COPULA PREDICATE. Die Blume Stapt. ---The flower '-blooms.

strong.

(4) In the case of compound tenses, however, the : auxiliary takes the place of the copula; which place is also held by the auxiliaries of mood, the place of. the predicate being occupied by the infinitive or participle. For example:---11.

Sep I	fafe have	gelejen. read.
Gr	Faun	febreiben.
He	can	write.

(5) When any verb which assumes the place of the copula is employed in the compound form, the participle or infinitive belonging to it stands after the proper wedleads, as —

Sunject.	copula.	therigh genefen.	
He	has	foolish been.	
Gr	with	gelejen haben.	
Ho	will	read have.	

Joer.

St hat einen Brief — geschrieben.

Sch habe kent Anaben ein Buch gegeben.

Er hat ken Sohn einer Sünde beschuligt.

(7) Should both objects, however, be persons, the

accusative comes first; except the oblique cases of the personal pronouns (14, sz. er, fr. ci, mir, ijr. fir), which always take presedence, as: subplication of the complete subsect.

sun-Ject, copula, pinst object. sucond object. enedicate. Ich habe teinen Schn meinen Trunke empfohlen. Er wurd ihm feine Locheft gebin.

(8) When two personal prononns form the objects of a sentence, the accusative precedes the dative and the genitive, as:—

SUBJECT,	COPULA,	OBJECT.	OBJECT.	PREDICATE,	
©t¢	haben	t6	mir	gegeben.	
Wir	nehmen	uns	feinee	an.	
(9) Ad	verbs of	degree .	and mann	er, or nou	ns

governed by propositions, and serving in the place of adverbs, when they roler exclusively to the verb, stand immediately after the object. For example:—

SUB-COPULA. OBJECT. ADVERS. FREDICATE.

Gr hat feinen Gegenfland vortrefflich behandelt. Gr hat tes Gelb mit Frenten ausgegeben.

(10) Adverbs of time, and phrases used instead of adverbs of time, commonly come before the object and before adverbs of place. For example:—.

8UB CO. ADVERD, OBJECT. PREDICATE.

36 has gestern cinen Brief geschricken.

Gr ist ver brei Tagen in London -- angesommen.

(11) Adverbs of place, and nouns with pre-

positions used as such, generally come immediately before the predicate, as:—

Subsect. copula. obsect. adlene, predicate. Sch werte meinen Sohn nach Baris fciden.

(12) Nouns and pronouns, with the prepositions appropriate to the verb employed in the sentence, generally come immediately before the predicate. For example:—

3ch habe niemale über biefen Gegenftanb mit ifm gefprechen.

When, however, the preposition with its noun is merely used to denote the cause or purpose, etc., of what is expressed by the verb, it stands before the object. For example:

Bir tranten geftern aus Mangel an Bier Baffer, Sch tounte ifim wer Breuten feine Antwort geben,

INVERSION.

(1) In all the cases preceding, the instant order of the leading pairs ins been preserved; that is, the subject first, the copula next, and the predicate least. But for the sake of giving peopial emphasis to particular words, this order; is often inverted. Thus the real or logical subject is made complated by being pair after the copula, the pressure it faking its place as a grammatical subject, as — 3d leve it brighted in the different pair of the predicate is to be rundered emphasic, they exchange places, thus greetized amphatically—extres might: Wit, dit, all must. The chief places is which the copula receives the stress of the product of the predicate is to be rundered emphasic, they exchange places, thus greetized amphatically—extress might: Wit, dit, all must. The chief places is which the copula receives the stress

(a) In direct questions, as :—Schreibt ber Mann?

(b) In imperatives, as: Spreden Sie mit ihm,
(c) In the case of magn, when used to express a

wish, as:—Mige is her friming getter!

(d) In cases where surprise (generally with her) is to be expressed, as:—If here his State mic activit!

(2) When on any one of those words which in the natural order come between the ecpula and the predicate we wish to lay special emphasis, it must be put dister-before the other words standing between the copula and the predicate, or either before the subject. In this inster case, however, the subject and the copula exchange places, thus:—Fire we would be, 'Ghet learning where the common order would be, 'Ghet learning where the common order inversions, however, chiefly cone wites principal and subordinate sentences are connected by conumentons.

SENTENCES: PRINCIPAL AND SUBORDINATE.

(1) A principal sentence is one that expresses by itself an independent proposition: thus, "It was reported," "He deserves," "John toils."

(2) A subordinate sentence is one that serves as

a complement to a principal sentence, and without which it conveys no complete idea. Thus, in the expressions, "It was reported that the town was taken," "He deserves that we should defend him," "John tolls, although he is rich."—the first in each case is the principal, and the second the subordinate,

- (3) In the natural order, the principal precedes the subordinate sentence. But this order is often reversed; in which case the order of the subject and the copula in the principal sentence is also reversed. Thus, in the natural order we say, 36, 36; 38 r et al and right fant. Those that he cannot do not be a subordinate sentence first, it of the principal sentence is the subordinate sentence first, it cannot do it. Amor Z. T. Into most is, that he cannot do it. Amor Z. T.
- (4) When, however, the subordinate sentence coines in after the copula (that is, before a part only) of the principal sentence, the natural order of the latter remains unbhanged, as —34 Jam, as the insurance and must make the sentence of the sentence and must make the sentence of th
- (6) In subordinate sentences, the common order of the leading parts differs from that of the prinoipal sentences, in making the copula come last that is, in making the copula and the predicate exchange places. For example:—

	Gt,	ter mir ben Brief who to me the letter	brachte.
•	Hc,	wno to me the letter	orough
	Der, .	teffen berg rein	ift.
	Ich weiß,	wo ich ihn gefehen .	habe
	Er fagt,	bağ er es nicht thun	fann. ,
	Er ift arm;	weil er feft trage	ift.

(6) The subordinate sentence is usually connected with the principal one by means of some conjunctive word. The conjunctive word ab employed is either a relative pronoun, a relative adverth, or some conjunction, proper, expressing cause, condition, purpose, limitation, or the like. (See the examples under the preceding paragraph.)

(7) The conjunctions employed in connecting principal with subordinate sentences are—

	Mes.	Che.	Obiden.	Wenn gleich
٠	Muf tag	Salle.	Dbrecht	Wenn fcon.
	Bevor.	3c. '	Degivar	Benn ancy.
	Bis.	Be nachtem.	Grittent	Bic.
	Da. ·	3mem.	Ungenchtet.	Bie auch.
	Dafern.	Rachbent.	Bafrent	Binyehl.
	Danrit.	Muñ.	Beit.	Be.
	Dağı.	D6.	Wenn	Bofern.
	Duweil.	Diefeich.	Wenn nicht.	

After all these the copula is placed at the end ofthe sentence.

Day is sometimes omitted, in which case the

copula stands not at the end, but just as in a principal sentence, thus: -- Or fast, or home of principal

principal soutenee, thus:—Or bast, it beam istricted.

When norm is left out, the subject and the copula
stand as in a question, thus:—Beam in at geforicien
batte, m., or (without mean) batte in et geforieben, fo

marce is et 35mm griagt haben.
(8) The following are the conjunctive adverbs, which are used to connect subordinate sentences with principal ones, after the manner of real conjunction.

1,	ALCOTOLO .		
	Aufferbeni.	Entlich.	Micht allem,
٠.	Daljer	Serner.	Dicht nur.
	Dann.	Bolglich.	Dicht bleg.
	Mistann.	Gleichwohl.	Mec.
	Darum.	Inreffen.	Mur.
	Defitucgen.	Gernach.	Souft.
٠.	Definath.	Dachber.	Theile-theile.
	Dennech,	Beroch.	Ubrigens.
	Deffenungerehtet	Inteffen (mtef)	Albertice.
	Michteteftoweniger.	Jugleichen.	Bielmebr.
	Defigleichen.	In fo fern.	Boşt.
	Defto	In fo weit (jo weit).	Butem.
	Ginerfeite.	Raum.	Bmar.
	Unterfeits.	Dithin.	

These all reverse the order of subject and copula when they stand before the subject. When, however, they come after the copula, the natural order of the sentence obtains.

- (9) Mikan, bent, featernt, aber, unb, and eser always stand at the head of a sentence without influencing 'the order of the other words. Planning may also occupy the first place without altering the position of the other words.
- (10) Where a mood-auxiliary, or any such verb as takes the infinitive without 30, coours togethor with another infinitive, the copula stands before the two infinitives, thus:—Benn left as faite thun militar, 11, and Benn ide thun militar battle.

BRITISH COMMERCE.—II. {Continued from Fol. VII., p. 250.] SEA ROUTES (continued).

IV. With America our connection is very close, closer that in early days was the connection between London and Edinburgh. What with cables and fast-going steamships the ocean that rolls between the great continent and our small islands has

- been reduced to the dimensions of a "herring pand." These magnificent liners, of course, with their capacious holds and perfect machinery for loading and unloading, convey the bulk of American produce that comes by way of the Atlantic. There are some salling vessels, however, that bring deals

and timber, and the chief ports in this trade are Miramichi, Dalliousie on Chaleur Bay, and Shediac. Steamers purely devoted to cargo also ply, those from Canada calling at Cape Breton Island to coal. So numerous are the steamers of all kinds that cross the Atlantic that they sail in lanes or belts to avoid collision. Those going out keep within a lane of defined limits, and those coming home in another lane. Sailing vessels, however, take quite a different route so as to get the wind in their favour, the prevailing winds for ten months in the year blowing from the west. The chief ports on the Atlantic seaboard for trans-Atlantic shipments are Quebec, Montreal, St. John's, Halifax (Canadian), and in the United States Portland, Boston, New York, Philadelphia, Baltimore, Charleston, Savannah, St. Mary's (Georgia), and Darien. The two latter are called the pitch-pine ports, on account of the provailing nature of their shipments, the pitch-pine they send us being largely used in the manufacture of hed-room furniture, chapel pews, and masts. Baltlmore and Philadelphia send cargoes of tobacco. Among American ports on the Gulf of Mexico are Mobile, Pensacola, another pitch-pine port, and New Orleans. The latter receives all the produce of the Mississippi valley, and is the chief cotton port of America. Another centre of the cotton trade is Galveston. From the coast of the Gulf of Mexico ulso comes malogany-the leading ports being Conxacola, Honduras, and Bolize-in sailing vessels. These vessels issue from the Galf rid the Florida Channel, following the course of the Gulf Stream, which assists them along with its ourrent. From Yucatan used to come sisal hemp for ropemaking ; the Bahama Islands, however, which also provide pine-apples, are now likelyto become the chief source for this fibre.

Of the West Isida Islands the most beautiful is Trinkindal. Itselficiexports are in coson and ginger. On the Island is an extensive lake of pitch, covering an area of about 100 acres. It is now extensively quarried, and the pitch is of a highly superior quality. Its exports of this natural product, which is also found in Cubs, amounted to 86,000 tens in 1890; but a can be made, though not of the same quality, from the water product attendant on the nucking of cost gas. To these islands weeks said the nucking of cost gas. To these islands weeks and all of the trude winds; on the homeword porner, however, they more than double their course, sating first north, and then each of the course, sating first north, and then each of the winds or make an adverse wind favourable.

In South America the most northerly port of any importaince is Georgetown, whence is shipped Demerara sugar and cocoa. The chief Brazilian poits are Bahia, Pernambneo, Rio de Janeiro, and

Santos, whenes come sugar, fibres, and coffee. From Monte Video Urnguay sends wool, hides, horns, grains, and frozen meat, and across the Rio de la Plata is Buenos Ayres, whence the Argentine Republic sends its exports. This is the most sontherly port on the Atlantic side of America of any magnitude, and the most southerly point from which we receive any produce at all is the Falkland Islands. These are covered with tussock, a grass that grows about six feet high-not a tree is to be seen anywhere, . This grass affords a succulent food for cattle, and the inhabitants, who are all Scotch 'settlers without any natives, pull up the roots, roast, and cat them. The exports are wool, hides, and frozen meat. The route to South American ports is through the South Atlantic, vessels touching at the Cape de Verde Islands for coal:

V. On the Pacific coast of America to the north Vancouver is the only port of any magnitude. It enjoys now increased importance as being the terminus on the Pacific side of the Canadian Pacific Railway, and from here the Royal Mail steamships of the railway company leave at regular intervals for Yokolama and Hong Kong, Previous to the opening of this route the time between London and Yokohama was forty-three days, now it is twentyone. Writing on September 2nd, 1891, the Now York correspondent of the Times thus detailed a race of the mails by this route :- "The race with the mails from Japan to London has been watched here with great interest, and, up to the present, the record breaking has been us satisfactory as the Canadlan Paoific Railway could desire. By oatching the Inman steamer, City of New York, this morning the time between Yokohama and London will probably not exceed twenty-one days. The record of the trip up to the present is as follows :- The Empress of Japan left Yokohama at 8.45 a.m. on August 19th, and arrived at the Royal Road, Victoria, at 4.24 a.m. on August 29th. The mails were immediately taken off and sent to Vancouver, where they arrived at noon on the same day. A special train on the Canadian Pacific Railway was in readiness, and without delay the bags were placed in the mail car, the train leaving at 1.8 p.m. It arrived at Brockville. Ontario, at 9.3 p.m. yesterday (September 1st), having made the run from Vancouver, 2,802 miles, in 76 hours 55 minutes, allowing three hours for the difference in time. The transfer across the river at Brockville occupied 38 minutes, and the New York Central Railway then took the train from that point to New York, 300 railes, in 7 hours 2 minutes, reaching the Grand Central station at 4.43 a.m. this morning. The Imman steamship, City of New York, was timed to sail at 6.45 a.m., and the mails were on board at 5.10 a.m. They

should be in London in the evening of the 8th, thus verifying the prophecy of Mr. Van Horne, Freddeat of the Canadian Pacific Railway, that the time between Japan and London would be reduced to twenty-one days.

An idea of this vast railway, which runs during the whole length of its course through British possessions, and of its possible future effects, may

be gathered from the following:-

"The close of 1885 found the company, not yet five years old, in possession of no less than 4,315 miles of railway, including the longest continuous line in the world, extending from Quebeo and Montreal 'all the way across the continent to the Pacific Ocean, a distance of three thousand and fifty miles; and by the midsummer of 1886 all this vast system was fully equipped and fairly working throughout. Villages and towns and even cities followed close upon the heels of the line-builders: the forests were cleared away, the prairie soil was turned over, mines were opened, and even before the last rail was in place the completed sections were carrying a large and profitable traffic. The touch of this young giant of the North was felt upon the world's commerce almost before his existence was known; and, not content with the

trade of the golden shores of the Pacific from

California to Alaska, his arms at once reached out

across that broad occan, and grasped the tens and silks of China and Japan to exchange them for the

fabries of Europe and North America. "The next three years were marked by an enermous development of traffic, and by the addition of eight hundred more miles of railway to the company's system. One line was extended eastward from Montreal across the State of Maine to a connection with the railway system of the Maritime Provinces of Canada, affording connections with the seaports of Halifax and St. John; another was completed from Sudbury, on the company's main line, to Sault Ste. Marie, at the onflet of Lake Superior. where a long steel bridge earries the railway across to a connection with the two important American lines leading westward-one to St. Paul and Minneapolis and thence continuing across Dakota, the other through the numberless iron mines of the Marquette and Gogebic districts to Dulnth, at the western extremity of Lako Superior; still another, the latest built, continues the company's lines westward from Toronto to Detroit, connecting there with lines to Chicago, St. Louis, and all of the great Mississippi Valley. And, now, the company's lines spread out towards the West like the fingers of a gigantic hand, and the question 'Will it pay?' is answered with earnings for the past year of 161 million dollars, and profits of 61 millions.

"Canada's iroh gidde has given a magnetic impulse to her fields, her mines, and her manufactories, and the modest colony of yesterday is to-day an energotic nation, with great plans and hopes and aspirations."

The travelier to Xokolama by this route from Liverpool journeys first to Kew York, a distance of 3,180 miles, then to Montreal (884 miles), then to Amoouver (2,006 miles), and these across the Paoline to Xokolama, 4,300 miles—in all, 10,770 Miles—in all, 10,770 miles—in all, 10,770 miles—in all 10,770 miles—in all, 10,770 miles—in all 10,770 mi

Besides Vancouver, there are on the coast of British Columbia the Hudson's Bay Company's stations, who ee their furs are collected and sent home by ship. South of this, in United States territory, is the lumber-shipping port of Puget Sound. From Portland, Oregon, and San Francisco, which possesses one of the finest harbours in the world. are shipped large quantities of wheat in first-class sailing vessels. From the Pacific side of Mexico come the dre-woods; and from Guayaquil, Equador, eocoa and coffee. Along the Peruvian and Chilian coasts are numerous ports, between which a local trade is carried on, the main ports for the shipment of nitrates being Iquique and Pisagna, and of wheat Concepcion and Tabalenanho. The trade is carried on both by steamers and sailing vessels, the former coming home through the Straits of Magellan, the latter rounding Cape Horn at a safe distance from the land.

"VI. From Australasia and the southern Asiatic ports; the shortest roate is by way of the Suce Canal, Only sleamen, however, carrying eargest for which special ricegit-enter see chargest on affect to come the state of the stat

		, ·	,	Via Suez.	Via Cape.	Distance saved.
London	to	Bombay		6,274 n.m.*	10.719 n.m.	4,445 n.m.
	,,	Calcutta		7,974 ,,	11,606 ,,	8,632 ,,
**	**	Hong Kong	š	9,750 ,,	13,149 .,	8,410 ,,
**	**	Shonghan Yokohama	•••	10,486 ,,	18,805	2,846
**	**	1 OXOHRING	***	11,001 "	19,407 47	2,840 ,,

London by way of the Cape take, on the average-Bombay, 100 days; Calcutta, 108; Hong Kong, 125; Shanghai, 130; Yokohama, 137. Steamers by way of the Canal, steaming only 10 knots an honr, take to Bombay, 26 days; Calcutta, 33; Hong Kong, 40; Shunghai, 431; and Yokohama, 48. Among the effects of the Sucz Canal upon shipping was the increased use of steamers in our trade with the East, Previously steam, though employed on the Cape route, was never remunerative, as the distances between the coaling stations were so great that cargo had to be sacrificed to make room for fuel. As to the effect upon business metbods, the Chairman of the P. & O. Steam Navigation Company (Sir Thomas Sutherland, M.P.) said :- " The annihilation of distance effected by the Canal bas brought the East to our doors, and entirely changed the bases of our transactions with these countries. If some Rip van Winkle land fallon asleen while at the head of the affairs, say, of a great house in China, twenty years ago, and were to wake up to-day, he would be even more bewildered than his prototype was when he descended from the Catskill Mountains. He would find that all the old ways and most of the old firms had disappeared. The virtual monopolies which the distance between the East and West had established in the hands of comparatively a small number of firms would be found to have come to an end. The valuable produce of China and Jupan is no longer held in the London market until the experter is satisfied as to his profit. The merchant on this side is master of the situation; for by sending out n telegram he can receive in the course of six weeks whatever consignment he pleases in this country. Before the opening of the Canal, six months would have clapsed, even with the aid of the telegraph, before such orders could have been executed. On the other hand, in the export trade from this country, it is no longer the London or Manchester firms which determine the price to be paid in the East. It is the native buyer, operating through his bazaar or his hong; and in the Indian trade the native merchant may be said, even now, to be the operator on this side, for Manchester goods are shipped mostly on bazaar indents-a system rapidly extending to transactions with China," Great as have thus been the effects of the Sucz Canal upon commerce, yet only about half our trade with India. passes through it, the other half still adhering to the Cape route. The China and Japan trade which is carried on in steamers passes through the Canal. As regards our Indian trade, leading ports and products, are, jute from Calcutta and Chittagong, cotton from Bombny and Tuticorin, rice from Madras and

To reach the foregoing ports, sailing vessels from Rangoon, teak timber, whence is made the wedges onch by way of the Capte take, on the average—or keys used on the permanent ways of our railways, on the company, 100 days; Calcutia, 108; Hong Kong, 126; from Upper Burmah.

By the Sucz Canal route our Australasian colonies are also brought nearer. Purely trading vessels, however, use-the old route. Outward bound, after a ship crosses the line the trade winds drive her to the S.W. Losing the trades, she gets into the prevailing westerly winds of the southern hemisphere. which blow her due east upon New Zealand. Homeward bound she proceeds enstward round Cape Horn, the prevailing winds being behind her until she reaches latitude 35°, when she gets within the influence of the trades, which strike her on the right or starboard side at right angles to her course: the most favourable wind a shin can have. Across the line she meets the north-easterly trades, which are thus against her, as it is to the N.E. that she is sailing. She then proceeds N. until about intitude 320, when she gets into the prevniling westerly winds of the North Atlantic, and is by them blown right upon our shores.

ON SHIPPING - PRODUCE—HOW THE QUANTITY AND VALUE OF OUR IMPORTS IS, OBTAINED.

When a shipper puts goods on board a ship, he receives to two or more similarly worded documents the signature of the captain. Here is n copy of an actual document of such a kind, the goods in this case being shipped at Stockholn:

"Shipped by Messra, — and upon the good steamship — master, — now lying in this port, and bound for London Surrey Compereial Docks (120,201), one hundred and twenty thousand two hundred and for pieces of planed deals and boards, all mader the dock.

"To be delivered at the said port of London as above (all and every dangers and needlants of the seas and of navigation of what nature and kind seever excepted) unto order.

"Freight for the same and other conditions as per charter-party—dated Stockholm, the 10th November, 1899.

"In witness whereof I, the master of the said ship, have signed four bills of lading, all of this tenor and date, one of which being necomplished the others to stand void.

"(Signed) ----."

The above is a copy of a bill of Inding, three clubs smiles bills in this case having been signed by the master of the ship and given to the shipper, he himself retaining the fourth. All bills of lading are of smillar purport to this one, the bunguage and some of the conditions being writed. For instance, the exceptions to the goods being delivered in the condition in which they were shipped read thus in

another bill.—"the Act of God, the King's enemies, fire and all and every other denigers, and so on as above." Another, relating to a cargo of fries slipped at Rangous, goes into every detail at green length, and a single slipped at Rangous, goes into every detail at green length, from that querter. Here is only a small part of the—"The Act. of God; the Getern's occasine; plantes, robbers by land or sen; restraints of Princes, ratees, and people; vernin, rank, prays, leaking, steps, leaking, and the steps of the Getern's considerable of the Getern's considerable of the Getern's considerable of the Getern's considerable of the Getern's land of the Geter

The revocential tops of those bills of Indiags though still artitlein, has considerably diminished since the system of insuring goods has been universally adopted. In early times, too, the seas were loss known than now, and the dangers attending navigation greator. Navious, therefore, were the still and the still artitlein t

corgo.

Other viriations in bills of lading from the multiple one-lastical of "to be ablivered such as the control of the cont

The reason that several bills of inding ore signed to respect of each consignment is in case of less or damage to the bill intended for nee. Malis coming to the bill intended for nee. Malis coming damaged, and he case of contingencels or this kind it is ordigatly desirable to have other decomends to fail back upon. B is on account of this multipitoly of bills of miling that the damas is inserted, and the continue of the contin

When the consignment has been leaded and the black of the dispect of the silvery records to his cluster; and the fall of the dispect of the goods, black and the silver and

mouths, according to the terms that he may be able to make, the bill of lading is surrendered to hilo. With this duly stamped by the skip-brokers to show that freight and so on have been paid and settled, he proceeds to the docks mit hirs the goods delivered to bin. He then gets a produce broker in 'Mineing Lane or Mark Lane or the 'Wool Exchange, seconding to the kind of goods, to sell the goods, and with the money so acquired is oble to meet the bill lodged with the banker's.

In the Congoing process overyone implicated is sufaguarded, and business facilitated. A shipper may have a capital of only £100,000, but he can trade up to five or ten times that amount. Suppose the whole of its £100,000 to be ombericed on a surrance policy to the beak, rinks money on them. to invest in most of the cargo, .On this other course to the contract of t

The bank is equally safeguarded. If snything happens to the goods on the voyage, it does not signify—they are insured. Then in releasing the bill of lnding, the bank's egent at the port of destination knows the man he is releasing it to, or cise has guarantees that the bill he is exchanging it for will be duly honoured when it falls duo. In no other way could an extended commerce between different nations be carried on. The shipper of goods, say from St. Potersburg to London, could not bring the laws of Russia to operate in enforcing the payment of n debt owed by the agent to whom he might send goods in London. The bank can, however, under the laws of this country, force the agent to keep the terms he has entered into with Another advantage to the shipper results from what may be called the anonymity of bills of lading. The name of the consignee not appearing on the bill, no one knows who the shipper's customor may be-an item of infermotion that might prove very useful to a rival trader, and he is thus ensured in reaping the roward of his own

enterprine.

A ship's songer may be composed of one consignment only. It may be fall, say, of rice from one consistence of the constant of the constant of the constant of the limit of healty source of the constant of the limit of healty source of the ship's manifest. "Again, a ship's oxago may be composed of hundrate of different consignments—that is, different host of goods from different or manifest of the constant of the co

and Cochin.

inventory of all the goods on board. Here is a specimen of part of a manifest:-

specimen of part of a manifest:—
"In the barque ———, of Norway, 1,128 tons, seventeen men. Master. ——, from Colombo

The ship's manifest is for the guidance of the Customs officials, to whom a copy must be delivered by the captain within twenty-four hours of his arrival in dock, under a penalty of £20. This is called reporting, and it is from such reports that the "Bill of Entry "-a daily publication issued by the Custom House, giving the vessels and cargoes that have entered our ports-is compiled. Another document that has to be presented at the Custom Honse before a consignment can be released bears a description of the consignment according to the classification of the Imperial Tariff, the quantity, and the money value. It is from these documents. called entries, that the Board of Trade returns, giving the quantity and value of our imports, are compiled.

We have already explained how merchants, by procuring advances from bankers on successive cargoes, are not restricted in their trading operations by the amount of their capital. It is in this manuer that the bulk of our commerce is carried on; no enterprising merchant would dream of confining his operations to what his own money would buy, This is perfectly legitimate trading; it has, however, an element of danger in it. When prices are high and the market brisk, merchants use their utmost endeavours to supply the market. They embark in eargo after cargo to the full extent of their ability. In time the market becomes glutted with the par-. ticular kind of commodity they have been sending over, prices fall, and the goods cannot be sold, except at a loss. The banks then cease to advance money, and trade stagnation sets in. This kind of stagnation in trade is described as the result of over-trading, over-speculation, and its remedy is simply a matter of time, when the surplus stocks * Only dutiable articles are meluded in the stores enumersted in the manifest.

shall have been consumed. Such is the danger of the credit system.

There is another kind of trading that is not legitimate, though it is very widely practised, and especially in periods of stanguation following on over-trading, when there is little doing. At such times, as in busy times, nor-dimits have their staffs have a preamance of the staffs and the staffs have a preamance of the staffs and the staffs have appearance to keep up as well. It would nower do to have a room full of clerks all tillo. It would look as though no business were being done, and a man concerning whom it can be said that he is doing no business is not likely to get any

Thus in times of stagnation, when there are no legitimate transactions to do, merchants are tempted to engage in pure and simple speculation, gambling it is often called. In these transactions no part is played by any actual produce. One man sells another so many pounds of pepper at three months, say. The seller has no pepper, and does not intend to have any, and the bayer has no latention of buying actual pepper. All that is implied in this transaction is that in three months' time, if the price of pepper has gone up, the buyer will receive the difference between the present price and the price it rises to at the end of the three months; if, again, the price goes down, the seller then receives the difference from the bayer. Transactions of this nature are duly entered into the books of the parties to them, and wear all the semblance of real business.

When a bogus sale of this kind takes place, two parties immediately become interested in the price of pepper three months hence. The bogus buyer is anxious for the price of pepper to go up, the bogus seller for it to go down. . The soller consequently keeps on selling pepper to the full extent of his ability, which is to the extent to which he can get buyers to buy. The buyer similarly keeps on buying pepper to the full extent of his ability, which is to the extent to which he can get sellers to sell. There is thus no limit to transactions of this kind-the moment the seller ceases to sell, up goes the price, which means a loss to him; and the moment the buyer ceases to buy, down goes the price, which means a loss to him. There is thus no halting. The seller gets his friends to join him, the buyer gets his to join him; rings are thus formed, excitement grows, the opposing rings grow larger, the excitement grows more intense. Finally the weaker members of the opposing rings bréak down, anable to meet their liabilities, then stronger members, and then the ktrongest of allsometimes mercantile houses of high repute and doing an extensive legitimate business.

THE ORGANS OF SENSE .- VI.

[Continued from Vol. VII., p 365.] HL.-THE ORGAN OF SMELL (continued).

Ix birds the sense of smell is by no means so efficient as in mammals. This we may pronounce with certainty, because not only is the organ and its necessory apparatus less developed, but the habits of birds indicate that they are but little guided by the sense of smell. Raptorial birds, like flesh-eating animals, have better developed olinctory organs than grain-feeding fowis. The main nerve of smell of the vulture is five times the thickness of that of the turkey, although the carrion-feeding bird (first-named) does not exceed the other in weight; but it would seem that this senso in the vulture and condor is only useful to them in selecting while at their meal and does not guide them to the meal itself. A number of confined condors had some steaks of flesh, wrapped in paper, placed before them, but they gave no sign of being aware of their presence; when however, the paper was removed, they were seen tumbling over one another in their eagerness to snatch the food.

The general poculiarities of the organ of smell of birds are the following :- The nerve leaves the skull by one hele, and not through many, as in mammals; the membrano to which the nerve of smell goes is confined to the base of the beak, and the outer nostrils are not at the end, but at its sides or base : and though these nostrils are sometimes protected by a scale (as in the pheasant), or a sheath (as in the stormy petrel), or a bunch of stiff feathers (as . in the rayen), there are never any flexible cartilages moved by muscles. That singular wingless bird. thence called the apteryx, affords the only exception to the above statements, for its nostrils are at the end of its bill, the upper turbinated bones are of very large size, and many nerves pierce the skull. as in the mammalia. These peculiarities indicate greater acutoness in the sense of smell; and this is thought to be associated with its habit of probing among loose earth, to hunt for worms by scenting

In the pelican there are no external nostrils whatever; and this is, no doubt, reasonably accounted for by the fact that this bird fishes under water with its long bill, and dectains its prey for inspection in its capacious pouch. While in this position the contents of the bill send off effluvia to the nose by the back way of the palate; and since the nostrils of the bird, if it had any, would be above the water, and its prey below it, they could be of no service.

In the higher reptiles, the internal organ is very

like that of birds; but in some the nostrils are wide apart, and in others, as in all the erocodiles, they are united into one, which in the true crocodile of the Nile is shaped like a half-moon, and closed by a valve from behind; and in the gavial, or slender-snouted crocodile of the Ganges, the skin round the nostril can be raised so as to allow it to be just lifted above the surface, while the rest of the animal is concealed. In both cases the nostril is placed at the tip of the snout, for reasons which those who have read the lessons on the car will understand. Space fails to write of the organ in the serpent, the frog, and the siren; but, in passing on to describe it as it occurs in the fish, it should be remarked that in all the foregoing animals there is a communication between this organ and the airpassage to the lungs.

The position of these hind nostrila, as they are called, is, as we have seen, very various. In some cases they open just behind the teeth, as in the tond; and in others far book in the allienced transparent canal. They are sometimes double, and sometimes single; but they are always present, and consequently these animals all breathe naturally through the mose, and for this reason it has been difficult to discuss the function of small without trenching on the control of the control

, Its usual form is that of a roundish sac, opening on the side of the muzzle by one or two external. holes. The sac is either round, in which case a column of cartilage rises in the centre, and radiating folds run from this to the circumference; or elongated, when a bar of cartilage runs across it; and on each side of this plates pass off to the sides; and these secondary plates at their middle portion are elongated into flaps, which float freely in the water of the sac. An example of the first form is seen in the sturgeon, and of the last in the ray and dog-fish. In the drawing of the dog-fish, one sac is represented (Fig. 10) with a fore-and-aft flap to the nostril, the fore flap being pulled forward by two threads, so as to disclose the interior; while, on the other side, these flaps have been wholly removed, to expose the organ. These cartilaginous flaps are moved by proper muscles, so that the water in the sacs can be rapidly changed by their action; hence these fish have been said not only to smell, but to scent their prey. In the lamprey, or nine-eyed eel, the nasal sac is single, and in the middle line above the head.

In the nautilus Professor Owen detected an organ of smell, and such organs as are thought to be offactory in other molluses are always placed near tho breathing orifice. In insects or crustaceans some of the joints of the antenne are modified, and contain small sacs, in the walls of which fine nerve-twigs end; these are, with some show of reason, supposed to be the organs of the sense of smell.

IV.—THE ORGAN OF TASTE In proportion as sensations are dissociated from

our mental processes, so are they more closely linked with our animal wants. Scusation bas two functions-one is to inform the intellect and set the thoughts n-going, and the other to prompt us to do that for the well-being of the body, or for the good of our race, which we should not do, or not do so well and fittingly, unless we were so prompted. All sensations perform both of these functions, but they perform them in very different degrees : thus, the eye, of all the organs of sense, is the most efficient sterer to the mind, but it scaroely prompts directly to any lastinctive act. It may stir pleasurable ideas in the mind, but the sensations of sight, irrespective of the ideas they leave, can scarcely be called either pleasurable or painful Now if we contrast with this most intellectual of all our senses that which is associated with the tengue, we shall find that the relation to these two functions is reversed. The mind, it is true, discriminates between sensations of taste, but it does not dwell upon them, and it cannot readily recall the distinctions to memory. If this statement should be thought to be incorrect, because gross sensualists may be said to dwell much upon the gratification of their appetites for meats and wines, it may be answered that they dwell not so much on the distinctive ideas of the sensation as on the general remembrance of the gratification they caused; and they dwell on it not as in itself worth entertaining, but as useful knowledge to aid them in repeating the pleasure at some future time. Fow men take delight in dwelling on or describing the sensations of taste; but even an anohorite will own that the pleasures of this sense are, while they , intense, and quite sufficient to cause ordinary individuals to keep the body well supplied with good food, oven though the thought of what quantity or anality of aliment is necessary never crosses the The young, whose tastes have not yet been vitiated, usually cat heartily, with a keen sense of enjoyment while at their meals; but between these their minds are wholly unoccupied with the nature or the pleasures of these meals. The contrast drawn above seems fally to bear out the statement that sensations which are good incentives to intellectual action are not good prompters to instinctive action; and that in proportion as senses cease to be dis criminating, they become pleasurable or painful.

A pleasurable or a painful sight means one which impresses the intellect favourably or not; but nn

agreeable or disagreeable taste is strictly confined to the sensation itself.

It will be shown, in speaking of the organ of taste, how intimately the gratification of this se is bound up with the necessities of the body. In the meantime, assureing this to be the case, we remark that inasmuch as the wants of the mind are insatiable, while those of the body are limited, the senses more intimately connected with ench partake of the nature of these different wants; hence, while the eye is never satisfied with seeing, the gustatory sense is soon cloyed, and the appetito it engenders is only intermittent. Again, with regard to those sensuous impressions which are pleasurable, it would seem that Providence has ordained that the pleasure shall be so united to the requirements of the body, as that it shall be impossible fully to enjoy the pleasure without supplying the requisites to health and use. On the other hand, no natural necessity oan be satisfied without gratifying the senses. Evon our limited understanding recognises that it would be dangerous to entrust men with an animal enjoyment which was objectless, and which could be ec stantly excited: for this would be a bar to all the higher aspirations of the soul. The Divine Wisdom. has not only recognised this danger, but has provided against if by such elaborate contrivances that the attempt to gratify the senses irrespective of the ends for which they were given us—an attempt sure to prove abortive sooner or later-is considered to ot only sensual, but unnatural. The preceding remarks are necessary to the

eclation of some points in the structure and tion of the organ of taste. The sense of taste position of the organ of taste. The sense of taste is not of quite so simple a nature as those of sight and hearing, or even of smoll. This sense seems to shade away insensibly, on the one hand, into that of ordinary touch, which the inside of the mouth shares with the whole surface of the body; and, on the other, it graduates into another sense, which may be called a sense of relish, which the mouth shares with the stomach and alimentary canal. The sent of the sense of taste is the tongue; but here again it is necessary to remind the render that the uses of this organ are not confined, as those of the eye and ear are, to the reception of the impressions which excite the sense. The tongue is, in its substance, a sheaf of muscles, and it is largely employed in keeping the food between the teeth that it may be ground evn, in crushing the softer mass and mixing it with the saliva, and in propelling it into the threat. It is further employed as an instrument of speech; so much so, indeed, that in poetry-and even in common speech—it is more prominently associated with this office than with any other, and in this capacity has been the object of that powerful and

poetic description contained in the Epistle of James. Nevertheless, since the organs of unsteared distributed over the surface of the tongue, it sooms necessary to describe it as a whole. If the reader will refer to the engraving (Fig. 1) he will find the surface of the tongue drawn as it would be seen if it for whole of

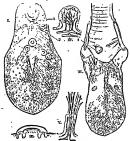


Fig. 11.—I. Heman Tongier. H. Tonger of Chimpanzer, with Lundry. III. Chicantally: Papille. V. Fermione Papille. V. Fermione Papille. V. Fermione Papille. III. Ref. to Nov. in Figs.—I. 1, Englottis; 2, Mucous follicles. III. 1, Brittle reselve into the pome of the laryes.

the roof of the mouth and skull were removed, so that he could look down upon it from above. The tongue covers the floor of the month; its border lies against the teeth. From the tip it rises to its central part, then slopes away backward to the throat, so that it nearly fills the closed mouth, and its upper convex surface lies along under tho concave palate. It has great freedom of movement, so far as its tip and edges are concerned, but cannot be earled completely over and thrust down the throat, because it is confined by a membrane, which attaches the middle line of its under surface to the bottom of the mouth. At one time it used to be the barbarous enstom of nurses to ent this membrane in new-born infants, a custom which not unfrequently resulted in the child being choked by its own tongue. It is with the upper surface of the tongue we have to do. as there the organs of taste are found, and thereby the food passes, seldon getting below the edges of the tongue. The tongue is covered with a mucous (or slime-secreting) membrane, and this membrane on its upper surface has a number of little projections. These projections, or papilla as they are called, are of three kinds, unmed respectively circumvallate, fungiform, and filiform papilla. The circumvallate papilla are situated at the back of the tongue, and are from eight to fifteen in number, ranged in the form of a V, with its point backwards towards the throat. They are of singular shape, best explained by the small figure which gives both a section of one of them and half its surface. They cach consist of a buttonlike projection of the mucous membrane, surrounded by a depression, and then an elevated ring which has another depression around it. They are called circumvallate, or walled round, papilic, because they may be compared to a contral tower surrounded by a wall; but the wall is a sunken wall, only made by sinking two ditchesone outside and the other inside it. The outside ditches of these miniature imaginary fortresses touch one another, and that which lies behind the hindermost one is so deep as to be called the foramen careum, or blind hole. These papilles are the largest of all; they are more powerfully affected by flavours than any others, and it is thought that the sapid juices run into the depressions around them, and thus the sonse of tasto is agreeably prolonged. It will be seen from the engraving that all the papille have secondary ones; but while the main papille thrust up the outer bloodless coat of the mucous membrane before them, the secondary



Fig. 12.—I TONGUE OF A CAT. II. FILITORM PAPILLA: OF A LYOPARD, III. TONGUE OF A FILIDFARE, IV. TONGUE OF AS O-TRICK. V. TONGUE OF A CHARLEON.

ones (i.c., the papillae on the papillae) do not do

The fungiform papille are seattered irregularly over the front two-thirds of the tongue, but are more plentifully distributed towards the edges and tip than at the central part. This arrangement prevents the delicate papilla being crushed by the tongue while it squeezes the food against the hard palate, while, at the same time, they are so placed that the juices of the food so squeezed run off the suinmit of the tongue, and come into contact with these little rounded eminences. Should the reader examine his own tongue, he will perhaps not at once detect these round papille, for they are obscured by the dense coating of filiform papilla, which are, under ordinary circumstances, longer than they. If, however, he press his finger on the middle of his tongue, these round knobs will at once start out and become visible, being distended with blood. If, further, a little vinegar be placed on the tongue in a space between these papille, no taste is: observed: but if it run on to them, they immediately. erect themselves, and the sour taste is distinctly conveyed.

The difform papilla cover the fore part of the tongos, running in lines from the middle obliquely forward towards the odges, and other lines of them run, outside these, round the oxtreme point of the tongue. They are long and slender, and much maller than the others; and are surmounted by a naft of threads, consisting of thiok epithelium (or onter bloddless layer); and, hence they look white or yallow, and impact to the whole top of the tongue a light colour, which contrainst with the desprays of the great and under side. These papillae are paying the true that the contraint of tools than of reads.

All these papille are well supplied with bloodvessels, so that, when the onter cont is taken off, they seem, under the microscope, to be little else than tufts of blood-vessels. Nerves forming loops bave been traced into them, and these are the carriers of the sensuous impressions. These nerves proceed by two different routes to the brain. Those which proceed from the papillæ (including' the circumvallate) at the back of the tongue, are gathered into a bundle which joins the ninth pair of nerves; and those from the papillae at the front unite to form a branch of the fifth pair. Each of these sets of nerves conveys both common sensation and the special sense of taste; but the branch of the ninth is more concerned in carrying gustatory impressions, for the sense of taste is keenest in the large walled-round papillæ, and the pleasures of taste become gradually more intense in proceeding from the front backwards.

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GREEK.—XIX.
[Continued from Vol. VII., p. 341]
PERMUTATION: OF CONSONANTS.
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Tim variations in letters which have come under our notice are not subtimry, but depend chiefly on suphonio laws. Of such have and observances we have already spoken, in giving the uncontracted and contracted over lequivalents. The consonants also, in coming together, undergo changes according to determinate rules.

The consonants are divided into liquids (namely, $\lambda, \mu, \kappa, \rho$) and mutes (namely, $\kappa, \kappa, \tau; \beta, \gamma, \delta; \phi, \chi, \theta$), and by the union of σ with these the double consonants ψ , ξ , and ξ are produced: thus—

The nine mutes are divided in three ways, namely —first, the organ onliefly employed in pronouncing them, as=(1) Palatata (promodinced by the palatata), r_1 , r_2 (r_3 (largata (pronounced by the tength), r_2 , r_3 , r_4 (called also desitats; and (3) labelat (pronounced by the largata) consumed by the lips), r_3 , r_4 , r_4 second classification arises from considering what many be formed the predominant sound; thus, r_4 , r_4 , r_4 by the product of r_4 and r_4 are r_4 are r_4 and r_4 are r_4 are r_4 and r_4 are r_4 are r_4 and r_4 are r_4 are for a size of third division into leaves (or slender), r_4 , r_4 ; r_4 sudder (or middle), r_4 , r_5 ; r_4 and r_4 are r_4 for a spintate), r_4 , r_5 , r_6 , $r_$

The following, then, are the facts which regard the near and interchange of the consonnuts:— Λ p-sound (e, β, ϕ) or a k-sound (e, γ, χ) before a k-sound, (e, γ, χ) before a k-sound, (e, γ, χ) before a k-sound, (e, γ, χ) before a constant (e, γ, χ) before an applicate, as θ , only an applicate, as θ or χ . Thus you have we and (e, γ, χ) sand (e, γ, χ) sand (e, γ, χ) and (e, γ, χ) sand (e, γ, χ) and (e, γ, χ) sand (e, γ, χ) sa

```
CORRECT FORM.
β before τ becomes w, as τρίβ-ω, I rub, τέτριβ-ται, τέτριπται.
              .. w " ypádos, I write, yézpad-rat, yézpanrat
                   a , Afrio, I speak,
                                         Achtyrau, Achterau.
                       " Bpexu, I teet,
                                          βίβρεχ-ται, βέβρεκται.
                                                      κύβδα
                    B' ,, Könre, I bend, Kur-da,
   **
              ,,
                    β ,, γράφιο, Ι write, γράφ-δην,
                       ,, nhênu, I weate, nhên ber,
                       " Sprixu, I wet,
                                          βριχ-δην,
                    φ ., πέμπω, I send, έπέμπ-θην, έπέμφθην
                   φ , τρίβω, Ι ταδ. ετρίβ-θην, ετρίφθην.
Χ , πλέκω, Ι τυατε, εκλέκ-θην, επλέχθην.
                                        έλέγ-θην, Ελέχθην.
                    X ,, heyes, I saty,
```

The preposition in remains unaltered before and θ ; as indonval, indexival, etc., not indonval and indexerval.

The tenues (namely, π , κ , τ) pass into the corresponding aspirates (ϕ, χ, θ) not only in

GREEK. with ; and dwelle, I run with.

(ar and mep), rarye (rdr and ye).

 \vec{L} , (κ, γ, χ) \vec{L} , (τ, δ, θ)

control, Activerse,

Terfi-eu

hiyeu fpixeu

ikeiben n

Compare the Latin imbno and imprime. Never-

thelers, we find ourreise, I stretch ; gwie, I bind

The excitive, or those words which receive a particle at the end, form an exception: as Is were

before

Toide. I rele

ypiów, I write nkiew, I tu ist

λεγω, Ι σιη βρίχω, Ι seel ἀνότω, Γ βαιολ ἐρείδω, Ι συγγου

ikniga, I hopo

Compare also, in the Latin, dazi, from dare;

g disappears; as—

Aifu.

P-cound (π, β, ϕ) unites with σ to form ψ .

```
read, from rego; and coad, from coque. As an
    N before another liquid passes into the same
                                                                                                             exception, in the proposition de the a before of
Houid: as-
                                                                                                             romains: as exocice, I care.
        συν-λογίζω, Ι τεπισπ. becomes συλλογίζω,
                                                                                                                 N vanishes before s, and if s is connected with
         ir-piru, I remain in
                                                                            deples.
                                                                                                              a t-sound both sounds vanish before o; but the
        our-place, I throw with "
                                                                           συρρίατω.
                                                                                                             short vowel before the o is lengthened-that is to
                                                                                                             rav. e into es e into es and & I, 6 into a, I, 6; ns-
The same is seen in the Latin illino (is and line).
                                                                                                                                  Sainer-on becomes Seiners
imminco (in and manco).

An exception is found in the preposition &
                                                                                                                                  TUPPLET-GI
                                                                                                                                                                            Tupbellet.
                                                                                                                                  0x18.00
                                                                                                                                                                             oxelow.
before p, an deployer, I throw in ; yet in Latin
                                                                                                                                   186er-es
                                                                                                                                                                             Atolier.
frruo, not inruo.
                                                                                                                                   FAund-m
                                                                                                                                                                             Edulet.
  -sound (π, β, φ) before μ passes into μ.
k- ,, (κ nnd χ) ,, μ
                                                                                                                                  SUKPOST OF
                                                                                                                                                                             Seine Gor
                                                                            y, but y re-
                                                                                                                                                             ..
                                                                  mains unchanged.
                                                                                                                  The following are exceptions :-- iv, as iver-op
t- ,, (7, 8, 6) ,,
                                                                                                              I som in : when, as weakfremes, thickly shaded ; some
                                                                            σ: n*--
                                                                                                              inflections in -ees and -ers, as reparees, from pairs,
I. pisound, wirest use, from spifes, I rate,
                     Acteur-per
yeyper-per
                                                                                                              I show ; and a few substantives in -ors and -ors. The
                                                                                                              e in our in compounds before o and a following rowel
                                                                                                              passes into o, as overeifo; but if after v a o with a
                                                    Airon, I say,
                                                                                                              consonant or a follows, then the r disappears-as
                                                                                                              είσ-στημα, σύστημα; συν-ζύγια, συζύγια.
An exception to the extension of e into es before
                                                                                                              » and a t-sound appears in the adjectives which end
                      second-ner
                                                                                                             in -ses, -essa, -es, the dative plural masculine and neuter of which is -se: instead of -sess.
N before a p-sound (π, β, φ, ψ) passes into μ.
                                       (x, y, x, t) " y.
(r, t, t) remains unchanged: as
                                                                                                                  Two immediately following syllables of a word
                                                                                                              enmot in certain cases begin with aspirates, but
         **
                              .
                          becomen tursipla, experience,
                                                                                                              the first aspirate passes into the corresponding
 èr-wespla
                                                                                                              tenuls. This fact is exemplified in-
 iv Bássa
                                             ἐμβάλλω. I cast inte.
Er-opur
                                            έμφοων, sensible, rational. .
έμψυχος, ahimated.
                                                                                                                  (I) The verbal reduplication : as-
fr-wuxor .
                                                                                                              Instead of the chiapse, from tables, I love, we have ne chiapse, xiyosa , xiv, I yosa , nizvon, the chiapse, the chiapse , the c
συν-καλίω
                                             συγκαλίω, I call together.
                                             συγγιγιώσκω, Ι knom soith.
συν γιγνώσκω
σύν-χρονου
συν-ξέω
                                             σύγχρονοι, being at the san
                                             ovylla, I smooth.
                                                                                                                  (2) In the norist and first future passive of the
                                                                                           Etime.
```

weinvins.

heriotar.

méneura.

derivations and inflections, but also in compounds,

Instend of imprese, write ifficepor (iri and impo, a dry).

'n irremine , liberales (in and ifairs, I warr)

These changes also take place in crasis (that is,

where two vowels are mixed into one), as surepa

from và črepa. If the tences ar or ar precede, both

must be converted into ospirates, as epsiquepes in-

stond of intimpos (from fare seren, and imipe. day).

A f-sound (r. 8, 6) before another f-sound pas

into o, but in the perfect and plaperfect active is

inel6-one, from weller, I persuade, becomes inelatore,

, τέτυχα (τέττω, Ι stelle), , τέτυχα (τέττω, Ι stelle), , τέχ δείως (δείτως, Ικθή), , δηχήρερης (δέσα, δείτ, απεί ήμέρα), τέτριζα (τρίβω, Ι rπί).

before an aspirated vowel : time-

win being

dereurpee τέτριβ-α

dropped before #: ns--

zézeiő-ka " zelőw, I persuade

пчЮ-те́оз ,.

two verbs then, to scerified, and ribles, to place:

έτψ-θην, τυ-θήσομαι, έτέ-θην, τε-θήσομαι, historid of too one, etc.

(3) In some words whose root begins with the aspirate 8 and ends with an aspirate: for example — OPIX . Apit, Tp:x6s, hair; but the dative plural in Omitiv.

OAX-, rayos, swift; comparative carren. OA4-. Sarre, I hery; 2 nor. pass. drapn.

ΘΡΕΦ-. τρέφω, I nourish : Int. θρέψω, nor. έθρεψα.

Hore belongs also the verb \$\times_{\times_0}\$, I have, instead of fxe, fut, ffe; nor. faxor, instead of larger.

But in the passive or middle inflections beginning with 0 of the verbs just montioned (Oders and τρέφω), the aspirates remain : as-

10ρέφ-θην, Ορεφ-θήναι, Ορεφ-θήσεσθαι, τεθράφ-θοι έθέφ-θην, θοφθείς, θοφ-θήσομας, τεθάφ-θαι.

The two floational templantions of the imporative first notist passive would both begin with an aspirate, as -656s, but the lutter aspirate is changed into its tennis, as -0071; for example, Souked-Onti Nevertheless, the termination -0, appears in the second

norist passive, us vels-not Finally, the liquid ρ is doubled (1) with the nugment, as δρρεον; (2) in compounds, when the ρ is proceeded by a short vowel, as Ερρηκτος, anp is proceeded by a short vowel, as Epparens, un-broken, indestructible; Balloppovs, flowing deep; has Alphorous (from so and barrom, I strengthen), very strong, with only one o, since en is long.

FORMATION OF THE TENSES OF IMPURE VERBS Inpure verbs are these whose characteristic is a consonant. They are divided into two classes— Mute verbs and Liquid verbs. Impure verbs differ from pure verbs in two ways: first, they in part form the second tensos (second norist, second future, second perfect), and they in part undergo certain changes in the formation of their tenses namely, first, a strengthening of the stem by consonants or by lengthening the vowel of the stem. and secondly, by a change of the vewel of the stem, which may be tenned conversion.

MUTE VERBS. Mute verbs have for their characteristic one of the nine mutes !-

π, β, φ; αυ, βλίπω, Ι εςς; τρίβω, Ι τευ; γράφω, I write.

κ, γ, χ; ns, πλέκω, I hnit; Kyw, I lead; τούχω, I make ready.

τ, 8, 0; αs, ἀνύτω, I finish; άδω, I sing; πείθω, I persuade.

Many of these suffer certain changes in the stem or 1001. The stem of the verb, firstly, is strengthened. The characteristic consount is strengthened; thus, τότ-ω becomes τύπ-τ-ω by the addition of τ to the stem. In such verbs there are two characteristics and two kinds of stems, the pure and the impure. Thus, in row-rowthe unite wis the pure characteristic, and we the impure characteristic; and row-is the pure stem, while Towy- is the impure stem. In some cases the k-sound is converted into Tr or ee, as plets or opliand I shudder, the stem of which is the pure form pour ; or, in others, the f-sound is converted into C, as opdCo, I publish, from the pure stem opas. These strengthened and hupure stems remain in only the present and imperfect :-

Present Imperfect. Frium T02-7-W €-TUE-7-01 τέπ-σ-ω (τύψω). pplaae f-ppersor φρίκ-σ-ω (φρίξω) epd Cor T-woulder ppd5-o-w (ppdaw).

The strengthening may be in the stem-towel When this strengthening occurs-

ă le elunged into q.

FOR ev.

In this kind of vorbs there is a division into pure and tupure stems. The pure stem appears in the second norist active, middle, and passive, as well as in the second future passive. For example:-

PURE STEM.

becomes y Carr. Dove. - death - Private. Printe. Profes.

1 Carr. Dove. - death - risks - risk For every form of the verb which cannot be deduced from the present, another form of the present is assumed. For example, as round and peiow are the ordinary present tenses, yet emmot regularly give rise to certain derived teases, so are TYDO and TYPO presented as themes or bases on

which may be formed the second sorist passive

d-ros-nr nnd the second norist active 5-φογ-ον-

For the convenience of students these themes are

CONVERSION OF THE STEM. A second chance which mute verbs undergo in

printed in capitals.

their tense-formation consists in the change of the stem-rowel, which we call conversion-as, alterw, I steal, 2 nor. passive δ-κλάπ-ην, 1 perf. κδ-κλοφ-α, where the ε of the present is converted into a and δ. The converted vowel (conversion) appears only in . the second tenses and some first perfects.

Most mute verbs, having a monosyllabie stem

GREEK.

and ϵ for the stem-vowel, take in the second agrist active, middle, and passive, as well as in the second future passive, a no the converted vowel: ration. I turn. 2 nor. act. 5-rations.

τρέπ-ω. I turn, 2 nor. not. Ε-τράπ-ου. κλέπτω, I stent, 2 nor. pass. t-κλέπ-ην. This, however, is not always the case: as—

βλέπω, I behald, imporf. έ-βλεπ-ον, 2 nor. pass. ἐ-βλέπ-ην.
Some mute verbs with monosyllabic stems and

Some mute verbs with monosyllabic stems and c for their stem-vowel take, in the second perfect and pluperfect, the conversion o, and those which have a in those syllables take the conversion ot.

For example τρέφω, Ι πουτίελ, τέτροφα.

λείπω, I leave, λέλοιπα.

The same conversion is taken by the following verbs in the first perfect namely:—

eris in the first perfect, namely:—
κλέπτω, I perf. κέκλοφα (but perf. mid. or pass.
κέκλεμμαι).

λέγα, 1 perf. συνείλοχα, εξείλοχα (but perf. mid. or pass. συνείλεγμαι).

πέμπω, 1 perí. πέπομφα (but perí. mid. or pass. πέπεμμαι).

τρέπω, 1 perf. τέτροφα, 2 perf. of τρέφω. δείδω, I fear, 1 perf. δέδοικα.

The following three in the perfect and pluperfect middle or passive take as the conversion a, which does not pass into the first agrist passive:—

refew. I turn back, port. mid. or pass. **terpaupau

(but 1 nor. pass. δστρέφθην).
τρέπω, I turn, perf. mid. or pass. τέτραμμαι (but

1 nor. pass. έτρέφθην).

τρεφω, Ι πουτίελ, perl. mid. or pass. τέθραμμα:

(but 1 nor. pass. δθρέφθην).
REMARKS ON THE FORMATION OF THE SECOND

All the second tenses are distinguished from the first tenses partly in this, that they lack the touse-chamateristic, and consequently, attach the person-endings (-on, -only, -on, -neona, -o, and -on) immediately to the pure characteristic of the very immediately to the pure characteristic of the very as \$\int_{An} - o_{i}\$ partly in this (yet with the exception of the second period), that they are formed from the pure unaftered verbal stam--an, \$\int_{An} - o_{i}\$ \text{-o}_{An} \

The second perfect lengthens either the short stem-vowel, as \bar{a} into η (after ρ and vowels in \bar{a}), or it retains the long vowel of the present: as—

κράζω, I croak, 2 n. not. E-κράγ-ον, 2 per E-κέ-κράγ-α. τήκω, I mell, 2 n. pass. E-τάκ-ην, π τέ-τη-κ-α. Φεύγω, I flee, 2 n. not. E-φυγ-ον, π π E-φυγ-α. Verbs which distinguish the second acriss active from the imperfect either not at all, or merely by the quantity of the stem-rowed, lave no second acrist active and middle, theugh they have the second acrist passive, since the latter has a termination different from that of the imperfect, as-

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γράφω, I write, imperf. εγραφον. 2 aor. act. and mid. wanting. 2 aor. pass. εγράφην.

DIVISION OF MUTE VERUS.

Muto verbs, like the mute letters, are divided into three classes, according to their predominant letter. In each of these three classes are verbs with pure and verbs with impure characteristic in the present and imperfect.

 Verbs whose characteristic is a p-sound (π, β, φ, pure; πτ impure):—

(a) Puro Characteristic.—βλέπ-ω, Ι see; τρίβ-ω,
 I rub; γράφ-ω, Ι write.

(b) Impure Characteristic. ~ τύπτ-ω, I strike (pure characteristic π, pure stem TTΦ-); βλάπτ-ω, I injure (β, ΒΛΑΒ-); βίπτ-ω, I cast (φ, PIΦ-).

(2) Verbs whose characteristic is a k-sound (κ, γ, χ, pure; ττ or σσ, impure):—

 (a) Puro Characteristic.—πλέπ-ω, I μlαίt; Έγ-ω, I drive; τεύχ-ω, I frame.

(b) Impure Characteristic—optor-ω (Att. optor-ω), I shudder (puro characteristic κ, pure stem ΦΡΙΚ-); τάσσ-ω (Att. τάττ-ω), I set in order (γ, TAI-); βήσσ-ω (Att. Βήττ-ω), I cough (χ, BIK-).

(3) Vorbs whose characteristic is a t-sound (τ, δ, θ, pure; ζ, impure): as—

(a) Pure Characteristic.—ἀνύτ-ω, I end: ἡδ-ω,
 I sing: πείθ-ω, I persuade.

 (b) Impure Characteristic.—φρά(-ω, I say (pure characteristic δ, pure stem ΦΡΑΔ-).

Some verbs ending in -rwo or -arm have for their pure climateristic not a k-sound, but a t-sound; as, spydrrw, I adapt, put together, fat. -dow; zblaven, I steer; adarw, I bestrae; xhdoow, I form; valeaw, I provided, I provided by valeaw, I press together, has both formations: as, fut rdzw, etc., perf. mid. or pass. rdragay, vrolu ali, vardw.

Many verbs in .60, which for the most part express a sound or call, have for their pure characteristic not a t-sound, but a k-sound, commonly y; for example, aid(s, I huent [eye ut. u]); abanda, I short the var-ery; rol(s, I grant (like a) phy); paf(s, I roth (like a ravol); part(s, I ke a); ād(s, I bite; ejud(s (int. -topus), I berail (cry ort at).

The following in - (have both formations:-

aspirate: c.g.-

Εποτάζω, I carry, fut. -άσω, etc., nor. pass. εβαστάχδην: νοστάζω, I nod, am dromay, fut. -άσω and -άξω; παίζω, I play, joke, fut. παιξούμαι and παίξομαι, norframa: υστί, mid. or bass. πέπαισμαι.

The following three in -ξω have for their pure characteristic γγ, namely :-κλάξω, I sound, I ciong, 2 pect. κέκλαγγα, fut. κλάγξω, ασ. έκλαγξα; αλάξω, I mislead, load astroy, fut. κλάγξω, etc.; σαλαίξω, I sound a trumet, fut. ακάγξως.

FORMATION OF THE TEXSES IN MUTE VERBS.

The first perfect and pluperfect active change a n-sound or a k-sound for the corresponding

> p-sound τρίβω, τέτριβα (τέτριφα), λ-sound πλέκω, πέπλεκα (πέπλεχα);

int have the terminations -ka, -kev, when the characteristic is a t-sound; though the t-sound disappears before k-as at-res-ka, from ness-w.

The vowels a, ι, υ in verbs having a t-sound as characteristic are short before the terminations with the tense-characteristics σ and κ (ε,κ., εκτυ), as:—φρά(ω, φράσω, ζοράσα, πέφράκα. In the sume way, short vowels remain short, as ἐρμάζω, I jit, διομέκα.

When precedes a p-sound as the characteristic (as, for example, in when, I see all p is thrown our laters the terminations beginning with p in the perfect middle or practice, on wf-reg-pa instead of (xf-reg-pa) xf-reg-pa; character. Then, xf-reg-pa; most of (xf-reg-pa) xf-reg-pa; character. Then, xf-reg-pa; most of (xf-reg-pa) xf-reg-pa; x

Vorbs whose characteristic is a t-sound do not, in ordinary speech, form the second sorist,

The terninations beginning with σθ after an immediately preceding mute lose the σ, whereon the mute ussumes the nepirated form in consequence of the following θ, us ακερέφθαι, instead of κεκρέφθαι (that is, κεκράσσος).

The third person plural perfect and phaperfect, middle or passive, which properly one file **res* and liquid, he see formed, on account of the conding together of he see formed, on account of the conding together of the particular perfect middle or passive and of the particular perfect middle or passive and of the third person plural present and imperfect of the vertil due (Id.4, are, and #eas. **pers). Sometimes, however, the **person plural person plural present and imperfect of the vertil due (Id.4, are, and #eas. **pers). Sometimes, however, the **person plural person in the size referred to above, by which ** after a command it wentled, but field, after a **person and the size referred to above, by which ** after a command it is weathered, but field, after a **person and **person an

		Third Plare	bistend of	Pluperfect.
τρίβ-ω	те-трен-наг	тетріфатац	(τέτριβεται)	ітетобрато.
mhće-es	mr-macy-man	πεπλίχαται	(winkentai)	entakezaro.
TÉTT-10	τέ-ταγ μω	reragaras	(τέταγνται)	
χωρίζ-ω	κε-χώρισ-μαι	κεχωριδάται	(кехоробетия)	
фОсеръю	i-obos-uni	έφθάρ ά ται	(ἐφθαρνται)	собарато

PARADIGMS OF MUTE VERBS. (1) VERBS WHOSE CHARACTERISTIC IS A p-SOUND

(π, β, φ).

(α) Pure Characteristic π, β, φ; fut. ψω.

ACTIVE VOICE.

Pres. ind. $\tau \rho i \beta \omega$, $\hat{I} \tau n b$, subj. $\tau \rho i \beta \omega$, imp. $\tau \rho i \beta \varepsilon$. inf. $\tau \rho i \beta \varepsilon \omega$, part. $\tau \rho i \beta \varepsilon \omega \nu$.

Imperf. ind. ξ-τρίβ-ον, opt. τρίβ-οιμ.
Fut. ind. (τρίβ-σω) τρίψο, opt. τρίψοιμι, inf. τρίψειν.
I Aor. ind. ξ-τριψα, snbj. τρίψο, opt. τρίψαιμι, imp. τρίψον, inf. τρίψαι μιτ. τρίψον.

1 Perf. ind. (τέτριβ-α) τέτριφ-α, subj. τετριφ-ω.
inup. τέτριφ-ε, inf. τετριφ-έναι, part. τετριφ-ώς

ip. τε-τριφ-ε, int. τε-τριφ-εναι, part. τε-τριφ-υ 1 Plup. ind. (ε-τε-τρίβ-η) ε-τε-τρίφ-η.

MIDDLE VOICE.

Pres. Ind. τρίβομαι. Imperf. ind. ἐ-τρϊβ-όμην. Fut. ind. τοίψουαι.

1 Aor. ind. ετριψάμη».

Perf. ind. τέ-τρι-μμαι, -ψαι, -πται, ctc.; imp.
τέ-τρι-ψα, -φθα, ctc.; inf. τε-τρί-φθαι; part. τε-τριμ-

μένος; snbj. τε-τριμ-μένος &; ορτ. τε-τριμ-μένος εξην. Plup. ἐ-τε-τρίμ-μην, -ψο, -πο, etc. 3 Fut. ind. τε-τρίψομαι.

ии, те-тріфории.

PASSIVE VOICE. 1 Aor, ind. (ἐ-τρίβ-θην) ἔ-τρίφ-θην.

1 Fut. ind. τριφ-θήσομαι.

Aor. ind. ¿-τρίβ-ην.
 Fut. ind. τρίβ-ήσομαι.

Terbal .1dj. (τριβ-τός) τριπ-τός, -ή, -όν; τριπ-τέος, -ία, -ίον.

N.B.—The i in refigu is long, except in the perfect and second agrist, and in compounds formed from the second agrist.

(b) Impure Characteristic πτ; fut. -ψω.

res.	κόπτω, I knock.	кожто	yıaı.
Perf.	κέκοφα.	кскор	μαι (like τέτριμμαι).
Perf.	κέ-κοπα (Hom.).		1 Λοτ. ἐκόφθην.
nt.	κόψω.	κόψομαι.	1 Γιπ, κοφθήσομαι.
Aor.	ξκοψα.	ἐκοψάμην.	 Λοτ. ἐκόπην.
Fnt.		κεκόψομαι.	2 Fnt, compropar.

Terbal Adj. контоз, контоз.

So conjugate κάμ π-τ-ω, I bend, Int. κάμψω, nor. ἴκαμψα, perf. mid. or pass. κέκαμμαι (instead of πέκαμμ-μαι).

EXERCISE IN PARSING. '

Give the parts and the meaning, and explain the formation of-

Κέκαμμα. κεκαμμένδι εἶσίν. τρέπω. κεκόψομαι. τέτριψαι. τρίψαιμι, τετριψοίμην. τριπτέος. ἔσφιγμαι. κεκωρίδαται. Εκράγου, κέκραγα, έλιπου, έγραφου. έσφιγμένος. δρμοκα.

VOCABULARY. .

Αἰών, -ῶνος, ὁ καὶ ἡ, age, Καλύπτω, I hide; κρύπτω, I concent.

'Aleipu, I anoint; et- Karaleinu, Ilenve, Ilenve αλείφω, I blot out. behind.

Επαμεινώνδας, -ου, Πρεσβεύτης, -ου, δ, α messenger; in the plur. Epaminondas.

Edoinions, -ou, & Euripiοί πρεσβεῖς, -έων. Προλείπω, I abandon. Odrte, I bury ; συνθέπτω, Plare, I cast. I bury with or at the Φαίνω, I show.

same time. Φθόνος, -ου, δ, envy. GnBaios, -ov, 5, a Theban,

EXERCISE 103.

· Translate into English :--

. 1 'Ο παις την επιστολην εγεγράφη. 2 ΟΙ πολέμιοι πρεσβείς είς την πόλιν έπεμψαν. 3. Τὰς τῶν σπουδαίων φιλίας, οὐδ' ἄν ὁ πᾶς αἰὰν ἐξαλείψειεν, 4. Πολλάκις όργη ανθρώπων νοθν έξεκάλυψεν. 5. Τώ Έπαμεινώνδου σώματι συνέθαψε την δύναμιν τῶν Θηβαίων ὁ καιρός. i. Eupinions de Manedoria rebantas. 7. Oebs tois δυθρώποις το μέλλον κεκάλυφεν. 8. 'Ακούσας καλον μ Άος τερφθείης αν. 9. ΟΙ στρατιώται τὰς τάξεις κατέλιπον.

N.B .- The optative with an sometimes expresses possibility; and the agrist is used of constantly repeated actions in a "quomic" (or "proverbial") sense, where in English we should use the present.

EXERCISE 104.

Translate into Greek :-

1. The letter has been written by the boy. 2. The boy wrote the letter. 3. The boys have written the letter. 4. Ambassadors were sent into the city by the enemy. 5. Wine often shows what man has concealed in his heart. 6. The future has been hidden from men by God. 7. The Lacedemonians brought up their children in rough customs. 8. A beautiful song delights us. 9. The enemy destroyed the city.

KEY TO EXPRCISES.

Ex. 93.-1 True beauty, which takes its source from divine communion, neither toil nor hunger, nor any neglect (on the one hand) nor time (on the other) wastes away. 2. Friendships (i.e., friends) seek to assimilate habits. 3. You could hardly make your praises equal to the virtues of the good. 4. O boy, emulalo good and prudent men. 5. Fortune often restores those who are in evil plight. 6. A multitude of troubles darkens the life of man. 7. Let young men strive after wisdom.

Εχ. 94.-1. 'Αμαυροίς το σθετος, ". 'Αμαυροί το σθέτος, 3. Οι υπίδες τὰ γράμματα ζητοίεν. 4. Ο πλούτος άιθρώπους τυβλοί. S. 'Haces/pou robe algunderout. C. 'Edenstepount robe naidos. 7. Πλευθερους του πατερα αίχμαλωτον. 8. Τούς κακούς πολίτας θοί. 9 'Η αμέλεια του βίου τους ανούτους τυφλοί. 10. Ένυφλούτην τούς φίλους.

Ex. 95 -1. When you are unable to use your wealth, in what respect do you defler from a poor man? 2. A kind word heals sorrow. 3. All mortals are pleased by being honoured. 4. Men contrive many things. 5. He is happy who hath means with pradence, for he uses them well. 6 The good man is honoured by oil. 7. The coursers did not use sandals on their

Εχ. 96.—1, Ίκροῶ, 2, Ίκροῶρτο S, Ίκροᾶτο, 4, Άκροᾶτοι, 5, Μηχανῶνται, 6, Έμηχανῶντο, 7, Χρῆται. S, Χρῆτθον. 9, Хрыстан. 10, Ехой. 11, Ехойто. 12. Ехойото. 13. Абогаτείς τῆ σῆ οὐσία σοφῶς χρῆσθαι. 14. Μακάριοί εἶσιν οἱ τῆ οὐσία σοφώς χρώνται,

Ex. 97 .- 1. Make the good man a companion. 2. It behoves the strong man to be gentle, that his neighbours may reverence rather than fear him. 2. Tattlers are disbelieved, even though they speak the truth. 4. The Persians were hated and de-pised by the Greeks. 5. He who does no wrong needs no law. 6. Troy was besleged by the Greeks for ten years. 7. Let no one fear death, the end of svils.

· Εχ. 98.-1. Μη καταφρονείτε άλληλους. 2. 'Απιστοθεται. 3. Καταφρονείς τους κακούς. 4. Καταφρονών καταφρανείτα. 5. 'Αδικεί. 6. Οι' άδικουντες άδικουνται αυτοί. 7. Φοβούνται θάνατον, ἀπόλυσιν κακών. 8. Οἱ πολίται φοβούνται μἡ ἡ πόλις πολιοορήται. Β. Δληθεύουσιν.

Ex. 99 .- 1. We are slaves to the flesh and the possions, 2. We free our friends, but subdue our fees. 3. Be not proud of thy wisdom, thy strength, or thy wealth. 4. May he who is high-manded be humbled. 5. Those who oppose good men deserve to be pumished. 6. The solders were enslaved by the barbarians. 7. May all bad men be punished.

Ex. 100.-1. Ol nanol vý oapní šouhoduvat. 2. 20 ihoudepois τοὺς ἐχθρούς, ἐκείνοι οὐκ ἐλευθεβοθσι τοὺς φίλους. Β. Γαυρούται τους εχηρους, εκτινεί ους εκτυστουστό τους τίπους. αι δε έγμθοι τη στη ούοία. 4. Οι καιού ενατικούται τοις έγμθοις, αι δε έγμθοι μακάριοι είστιν. 5. Έξημιούττο. 6. Ζημιούνται Τ. Έξημιούμέθα. 8. Έξημιοδοθε. 9. Ο γανρώμετος τῷ πλούτῳ ταχὸ rancurolita.

Ex. 101.-1. Leonidas and his men died fighling bravely. 2. Portune has restored many in adversity. 3. Fortune trips up those whom she has exalted. 4. All things are easy for God to accomplish. 5. Never ollow unskilful men to judge. 6. The poet has made Ulysses, the most eloquent (of men), the most silent. 7. Good men will adorn their country. 8. Many who have acquired great wealth still do not use it out of stinginess. 9. The coursers did not use sandals upon their journeys. 10 The physicians will heal the wounds. 11. The tongue which has acquired seasonable silence brings honour both to young and old. 12. No one gamed praise by pleasures.

Εχ. 102.—1. Οι άγαθοι τους άγαθους άγαθους και τιμώσιι. 2. Οι γετευίαι τεατίαι τη άρετη άκολουθήσουσιν. 8. Αλέξανδρος 6 των Μακεδόνων βασιλεύς ένίκησε Δαρείον τον τών Περσών βασιλέα. 4. Οἱ πολίται τὸν στρατηγόν μεγάλης τίμης ἡξίωσαν. 5. Ὁ πόλεμος τὴν πόλιν πολλῶν πολιτῶν έχήρυσεν. 6. Οἰ πολέμιοι ἐνικήθησαν. 7. Οὶ ἐατροὶ τὸ ἐλκος ἡκέσαιτο. 8. Οὐδείς Encurer rait hourait arforras. 9. Harra et rerédegras.

SPANISH .- IX. ·

(Continued from Pol. PH., p. 373.1

CONJUGATIONS OF REGULAR VERBS (continued). THE PASSIVE VERB (continued).

INSTEAD of employing the auxiliary verb ser (to be), and the participle of the verb agreeing with its nominative, the personal reflective monoun as is often used in the third person singular and plural with the proper tense of the active verb. Thus, we may say, el libro ha sido hallado, er el libro se ha hallado (literally, the book has found itself), and both forms are to be rendered in English, the book has been found. 'This is a very important rale of Spanish grammar, and must be kept in mind by the student.

Vacantain

Abria, to open. Botolia, ledile	think.	Linuar, to cell, to
Clamor, sour, class- our Continuar, to con-	Pobler, to double, to corp av. Engañar, to deceve.	Llenat, to fill. Professa, prophecy. Purita, door.
tium.	Usenela, school.	Usar, to use.

In many of the following sentences the nominative will be found placed after the vorb, this being a very common order of construction in Spanish, especially in sentences in which se, with the active verb, is used in place of the passive verb.

Exercise 31.

Translate into English: -

1. Esta umger se llama Marm. 2. Se erce. 3. Este vino se vende á tres pesos la botella. 1. Se cuagnita V. 5. | Qué libros se usan en esa esencla ? 6. Las botellas se llenarán de águn 7. Se llená toda la ciadad de lmmo, 8. Aqui se lmbin el Frances. 9. Se abrirá la puerte. 10. Las casas se quemaron, 11, Aqui so venden libros. 12. Se emuplen las profecias. 13. Este hombre se llamn Pedro.

Expecter 35.

Translate into Spanish .--

1. Here French is spoken. 2. Knock (!lamad), and it shall be opened to you. 3. The elamour is doubled. 4. Are gold pens used? 5. The bottles will be filled with (de) wine, 6. The house will be filled with smoke. 7. The doors will be opened, 8. The prophecy is fulfilled. 9. The houses are burned. 10, Here books are sold (pres.). 11, This wine is sold at two shillings a bottle. 12. The letter will be continued. 13. All the gates were opened (norf. def.).

The passive verb is sometimes formed by the auxiliary verb cstar, instead of scr, as :- El caballo está Instimado, the horse is injured : la easa está mal constraids, the house is badla built.

Verbs are conjugated interrogatively, by placing

the pronoun after the verb; and negatively, by placing the adverb no before the verb; as:--

I Ame yo ? forc I f or do I love? El uo come, he does not cat, If an objective pronoun come before the verb, the negative no is then placed immediately before such prononn, as :-

: No la limbeis oido? have ne not heard it?

Yo no le vi. I grw him not.

One of the most important rules in Spanish syntax is that by which a nonn in the objective case, if it be a person, or immimute thing personified, and the direct object of a verb, is to be preceded by the preposition a. Thus a John loves his brother" would be in Spanish, Juan ama a su hermann, and not Juan ama su hermana; " Peter slew the barber " would be, Pedra mate al barbero," and not Petro maté el barbero.

VOCABULARY. .

Perdonar, to forgire, Robar, to rob. Doudor, ilelior. Henrar, to konsur, Matar, to slay, tok ill. Noche (fem.), night. to puritou. Recongenist, to 14-

Existerse 36

Translate into English:-

1. El madre ama á sus hijos. 2. El médico sama á los enfermos. 3. Ferdommos á nuestros deudores Dios anna á los que son buenos.
 ü. Ella tema al Americano. G. El juez perdonó al hombre que roho al padre de Pedro. 7. Mi criado mató á su padro. 8. Perdoné á todos mis dendores. 9. Podro me amo como á un hermano. 10. Visitaremos al presidente esta noche (to-night). 11. Recompensaré al que

EXERCISE 37.

Translate into Spanish:-

the honra.

1. We honour the judge. 2. This judge fears not God. 3. I forgive my debtors. 4. They called the painters. 5. The physician will heal many sick (persons). 6. They robbed the woman whom we rewarded. 7. Honour ve your parents (padres) 8. I love thee like (come) a father. 9. The ladies will reward their female servants.

IRREGULAR VERUS.

The irregular verbs in Spanish are such as do not conform exactly in their manner of conjugation to the model verbs (amar, comer, vivir). The deviations of each irregular verb are in most cases but slight, yet important to be known, as most of the irregular verbs are in general uso.

There are thirty-nine of the different irregular verbs: seven of the first conjugation, seventeen of the second, and fifteen of the third. Many of

* This rule applies only to rational beings or personified injects; thus we cannot say, and it is rerelad, but and to rerelad, "I love the truth." SPANISH.

these differ but very slightly from each other. All the irregular verbs are conjugated like some one of these thirty-nine forms. Four of these-viz, kaber,

ser, ester, and tener-have already been conjugated. Those verbs which undergo slight changes in the verb-roots or verb-endings of certain tenses or persons of tenses are not on that account deemed irreguinr, since these changes take place solely to preserve regularity and uniformity of sound, which would be dissimilar in some cases if these chances did not take place. Both regular and irregular verbs undergo such obanges when required by the rules

of pronunciation.

Namark.—In the following conjugations of the irregular verbs, those persons of the moods and tenses only which deviate from the regular conjugntion are given. Thus, in the first verb, ander, no tonse of the indicative mood except the perfect dofinito is given, because this verb is conjugated regularly in the other tenses of this mood. The student is therefore to romember that all me tenses, and persons not included in the conjugation are regular. We have, however, in all cases given the participle and gerund, whether formed regularly

IRREGULAR VERBS OF THE FIRST CONJUGATION. 1. The irrogular verb ander, to walk, is thus

conjugated:-IST, Past Participle. Andodo...Gervail. Amendo. ISD. Perfect Definite. Aniuve, anduviste, anduvo; anduvi-

andm lerels, andnyler 2. The irregular verb conter, to relate, is thus

conjugated:

The Fuel Participit. Contado.—Germal. Contambo.

Ich. Privest. Cuesto, cuantra; crenta; ..., ..., cuentan.

inc. Cuento, cuent, cuento; ..., ..., cuentan.

Sun. Privest. Cuento, cuento; ..., cuento; ..., ..., cuentan. This verb changes o of the verb-root into we, in the

three persons singular and third person plural of the 3. The irregular verb dar, to give, is thus con-

À

Jugnicol ...

Jur., Past Porticipie. Dudo, —Geneal. Dando.

Jur. Pracel. Der (see abbr Permes trrepoler).—Perject

Definite. Di, diete, dit i dimen, disteis, deron

Sen., Experies. Dien er diete, dietes der dieses, dien er

diene; dipmande de dietemen, diereis er dietes, dienen er

diene; dipmande de dietemen, diereis der dietes, dienen er

—Pier Pierra. Diener, Dierre, dieres, dieres dieteses, dietes, doren.

4. The irregular verb jugar, to play, is thus conjugated :-Jege

Ixr. Past Participle. Jugado.—Renad. Jugando. Ixr. Presst. Suego, jugas, juga; ; —, jugan. Ixr. Jugas, jugas ; —, jugas; —, jugas. Sus. Presul. Jugue, jugges, jugas; —, jugues.

This vorb takes c before g of the verb-root in the three persons singular and third person plural of the present indicative, the imperative, and present nnctive.

5. The irregular verb tentar, to try, to tempt, is thus conjugated :--

Iss. Pad Parlicipic Tentado, Geraud. Tentando, Isso, Prekut. Tiento, tentas, tienta; —, tentou. Isr. Tienta, tienta, itenta; —, tienten. Sen. Presul. Tiente, tiente, tiente; —, tienten.

This verb takes i before a of the verb-root in the samo persons and tenses us are irregular in the

ng verb. 6. The fregular verb error, to orr, is thus con-

inented:-

-, sermu

INP. Past Perticipie. Errado. - Geraud. Erraudo. IND. Present. Yerro, yerros, yerra : --, yerra . July. Yerro, yerra, yerra . --, yerrad. Sws. Present. Yoro, yerras, yesra ; ---, yerrad.

This verb is irregular in the same persons and tenses as tantar, and takes y before s of the verbroot in all the irregular persons. IBBROULAR VERRS OF THE SECOND CONJUGATION

7. The irregular verb calor, to be contained, to have room, is thus conjugated :-

have room, is thus conjugated:—
Dier, Just Parish, Chibles—Gernet. Capitanda,
— Project
Digitals. Claps, cupies, cupy; capitans, cupiesds,
— Project
Digitals. Claps, cupies, cupy; capitans, cupiesds, cupies,
— Capital Parish. Chief, cubies, cupies,
— Capitals, cubies, cubies, cupies,
— Capitals, cupies,
— Capitals,
— Cap s, emplére ; cupièremos, cupièrels, enpleren.

8. The irregular verb caer, to full, is thus conjugated:-

Let Past Participle. Caido.—Grund. Cayendo. 1800. Prenet. Caigo (no other, Persons irregular). 1819. Caigo. —, caigo: caigonos. ——, caigon. Suo. Preset. Caigo, caigos, caigo; caigonos, caigolis, caigon. nt indicative, imperative, and present sub- This verb takes ig after the verb-root in the first person singular of the present indicative, in the first and third persons singular and plural of the imperative, and in all the persons of the present

subjunctive.

9. The irregular verb hacer to make to do, is thus conjugated :-

 İsr. Paul Perticipie. Healm.—Gerund. Haziendo.
 Ixn. Present. Happ (no ofter Persbus trrepular).—Perfet
 Defaute. Rice, hiciata, hiso; hiciano, hiciatois, hiciaron.—Frest Piatra. Hard, hard; hard; hardune, hardis, hardun. lur. Hego, hez, hage; lugareos, ----, lugan.

Sun Present. Haga, hagas, haga; hagamos, hagan, hagan.— Imperfect, Hielem, haria, or hieless; hieleras, harias, or hieleses; luciera, haria, or blerese. Haciéranos, hariamos, or bielesemes ; him/rals, larinis, or hiereseis ; hicieran, harina, or hicrosen,-First Future, Hicrore, fricieres, hicrore, hicrorenos, -incièreis, hicieren.

Satisfacer, one of the compounds of the verb hacer. has in the second person singular of the imperative mood both satisfaz and satisface.

10. The irregular verb morer, to move, is thus conjugated :---

180. Past Participle. Movido,-Gernad. Moviendo.

IND. Present. Muevo, nateves, mueve; ---, ---, nateven,

Tur. Mueva, mueve, mueva; ----, muevan. Sun Present, Mueva, muevas, mueva; - , muevan,

This verb changes o of the verb-root into we in the three persons singular and third person plural of the present indicative, the 'imperative, and present

11. The irregular verb oler, to smell, is thus conjugated :-

INP. Past Participle. Olido,-Gerund, Offendo,

IND Present. Huelo, hueles, huele; ---, ---, huelen. lar, Haela, buele, bueia; -, bnelan. Si'n Present. Huela, huelas, hnela; -, -, linelan.

This verb changes as the preceding, and also takes h at the beginning of the irregular persons.

12. The irregular verb purecer, to seem, is thus conjugated :-

INT. Part Participle. Parecido,-Gernad. Pareciondo,

IND. Present. Paresco (no other Persons frregular).

Inr. Parezea, —, parezea; parezeamos, —, parezean. Bun. Present. Parerea, parezea-, parezea ; parereamos, parezems, parezeau,

This yerb, and all others ending in -acce, -cccr, and -over (except hacer and rocer, and, of course, their compounds), take a before e of the verb-root when the verb-ending begins with a or o. This can only occur in the first person singular of the present indicative, the first and third persons singular and plural of the imperative, and all the persons of the present subjunctive.

13. The irregular verb poder, to be able, is tims conjugated :-

18r, Past Participle. Podido, Genual. Pudlendo, Ino Present. Puedo, puedes, puede; -, pueden,-

Perfect Definite. Pude, jundiste, pado; pudnoss, publisteis, jundieron,—First Fature. Podré, podras, podra; podremos, nothers, nodrin.

Svn, Pietent. Pueda, puedas, pueda; ---, ---, pnedau,--Imprefect. Pudiera, podria, or pudiese; pudieras, podrias, or pudieses; judiera, podría, or pudiese. Pudieramos, podríamos, or pudiesemos; pudiérals, podriars, or pudiésers; pudierau, podrian, or pudiesen .- First Future. Pudiere, pudieres, pudlere; pudiéremos, pudiereis, indieren.

14. The irregular verb poner, to place, to put, is tirus conjugated :---

Inv. Past Participle. Puesto,-Gerund. Poniendo. IND. Present. Pougo (no other Persons irregular) .- Perfect Definite. Puse, pusiste, puso; pusimos, pusisteis, pusieron.-Fast Fature. Pondré, pondrás, pondrá ; pondremos, pondréis,

Inr. Penga, pon, ponga; pongamos, ---, pougan. Sus. Prevent. Ponga, pongas, ponga; pongamos, pongais, angah. Inperfect. Passers, pondria, or pusiese; pusieras. udians, or pusieses; pusiera, pondria, or pusiese. Pusiera-

15. The irregular verb querer, to be willing, to

wish, is thus conjugated :-

lar. Past Participle. Querido.—Gerund. Queriendo. IND. Present. Quiero, quieres, quiere; -, -, quieren.-Perfect Defluite. Quise, quisiste, quiso; quisimos, quisistels, quisieron .- First Fature. Querre, querras, querra ; querremos,

querrela, querran. IMP. Quiera, quiere, quiera; ----, quieran.

SUB Present. Quiera, quiera, quiera; -, -, quieran. -Inspected. Quisiera, querra, or quisiese; quisieras, querrias, or quivieses; quisiera, querria, or quiviese. Quisiérauros, querriamos, or quatésemos; quaierais, querriais, or quisiéseis; quisieran, querfan. or quivieren.—First Future. Quisiere, quisieres, quisiere ; quiviérèmos, quiviéreis, quisieren.

16. The irregular verb saber, to know, is thus conjugated:-

1xv. Past Participle. Sabido.-Gerund. Sabiendo.

1ND, Present, Se (no other Persons irregular) .- Perfect Definite. Supe, supiste, supo; suplmos, supisters, supieron. - First Future. Sabré, sabris, sabri; sabremos, sabréis, sabran.

lur. Sepa, -, sepa; sepamos, -, sepan. Sun. Present. Sepa, sepas, sepa; sepumos, sepais, sepais.— Imperfect. Supura, salaria, or suplese; supleras, sabrias, or suples, s; suplers, satria, or suplese. Suplemmos, sabriamos, or supicemo; supicrais, salniais, or supicacis; supicran, salnian, or supicem.—First Future, Supicre, supicres, supicre; aupiéremos, supiéreis, supieren.

The irregular verb tender, to tend, to extend. is thus conjugated:-

1ng. Past Participle. Tendido.-Geroud, Tendiendo. IND. Present, Tremlo, trendes, tlemle : - , - , tlenden,

lar. Tienda, tiende, tienda ; —, —, tiendan. Sen, Present, Tienda, tiendas, tienda; -, -, tiendan.

18. The irregular verb trace, to bring, to carry, is thus conjugated:-

1xr. Past Participle. Traido.-Germal. Travendo. IND. Present. Traigo (no other Persons irregular) .- Perfect Definite. Traje, trajute, trajo; trajunos, trajisteis, trajeron,

lar, Tralga, —, tralga; traigames, —, traigan. Sun. Present. Traiga, traigas, traiga; traigamos, traigiis. traignu.-Imperfect. Trajers or trajeve, trajerses or trajeves, traiera or traiese : trairramos or traiéscuos, traierais er traieseis, Irajemu or trajesen.-First Future. Trajure, crejeres, trajere : trajerenos, Irajereis, trajeren.

.19. The irregular verb raler, to be worth, is thus conjugated :-

INF. Past Participle, Valido,-Germal, Valiendo, IND. Present. Valga (no other Persons trrenniar) .- First Fature, Valdré, valdrés, valdra; valdremos, valdreis, valdrás.

-, vaiga; valgamos, ---, valgan. Sim. Present. Valdria, valga, valga; vhigamos, valgdis, valgan.

—Imperfect. Valdria, valdrios, valdria; valdrianos, valdriais,

valdrian.

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- 20. The irregular verb ver, to see, is thus con- . jugated :-
- INT. Part Participie. Visto.—Gerund. Viendo. lup. Present. Veo (no other Persons irreputar).—Imperfect. Veia or via, veias or vias, veia or via; veiamos or viamos, veiais
- or viais, veiau or vian.
- Iup. Vea, vea; veamos, —, vean. Sun. Present, Vea, veas, vea; veamos, veais, vean.
- IRREGULAR VERBS OF THE THIRD CONJUGATION.
- 21. The irregular verb adquirir, to acquire, is thus conjugated :- '
- INF. Past Participle. Adquirido. Gerund. Adquirlendo. Ivo. Present. Adquiero, adquieres, adquiere; ----, --
- lur. Adquiera, adquiero, adquiera ; —, —, adquieran. Sun: Present. Adquiera, adquiera, adquiera; ---, ----,
- 22. The irregular verb asir, to seize, is thus coniugated :-
 - INF. Past Participle. Arido,-Gerund. Asiendo. IND. Present. Augo (ue other Persons (rregular).
- Intr. Auga, ---, auga; augamon, ---, augan. Bub. Present. Asga, asgas, asga; asgamos, asgais, asgan.
- The verb is but little used in those persons of tenses that are irregular.
- · 23. The irregular verb bendecir, to bless, is thus conjugated :--
- INF. Pret Participie. Bendecido.—Gerund. Boodeciendo.
 IND. Prevent. Bendigo, bendices, bendice; ——, bendicen.—Perfect Definite. Bendije, bendijiste, bendijo; bendiji mos, bendijísteis, bendijeron.

 Intr. Bendiga, bendije, bendiga; bendigamos, ——, ben
- Sun. Present. Bendiga, bendigas, bendiga; bendigamos, bendigais, bendigan,—Imperfect. Bendijera or bendijese, ben-
- dijens or bendijeses, bendijese er bendijese; bendijesenoos or bendijesemos, bendijesis or bendijeseis, bendijesen or bendijeseo .- First Future, Bendijere, bendijeres, bendijere ; bendi-. Jéremos, bendijérals, bendijeren.
- Maldeetr, to curse, is irregular in the same persons and tenses as bendecir. .24. The irregular verb decir, to sav, is thus con-
- jugated :-INP. Past Participle. Dicho.-Gerund. Diciendo.
- IND. Present. Digo, dices, dice; —, —, dicen —Perfet Definite. Dij.; dijinte, dijo; dijimon; dijinten, dijeron.—First Futuric. Dire, diras, dira; diremos, direis, daran. IMP. Diga, dl, diga; digamos, ----, digan.
- Sus. Preced. Diga, digas, diga; digamos, digdis, digan.— Juperfect: Dijem, diria, or dijese; dijems, dirias, or dijeses; díjera, diría, or dijese. Dijéramos, diriamos, or dijésemos; dijėrais, dirfais, or dijėseis; dijeran, dirfan, or dijesen.—First Future. Dijere, dijeres, dijere; dijėremos, dijéreis, dijeren.
- Contradeoir, desdeoir, and predeoir end their second person singular of the imperative in -ice : as, contradice, desdice, predice. In other respects
- they are conjugated like dectr. 25. The irregular verb dormir, to sleep, is thus conjugated :-

- IST. Past Participle. Dormida. -Gerand. Durmicudo. IND. Present. Duermo, duermes, duerme : ---, duermen.-Perfect · Definite. -, -, durinto; -, -, dur-
- for. Duerma, duerme, duerma ; durinanos, ----, duerman. Scs. Present. Duerma, duermas, duerma; durmamos, durmais, duerman.—Imperfest. Darmiera er durmie-e, durmieraor durmieses, durmiera or durmiese ; durmiéramo, or durmiés, durmiérals or durmiésels, durmieran or durmiéseu.--First Future. Dormiere, diarmieres, diarmiere; duraticremus, durmiéreis, durmieren.
- 26. The irregular verb erouir, to stand erect, is thus conjugated:-
- Ist. Past Perticiple. Erguido .- Gerund. Irguiendo.
- IND. Present. Hiergo es yergo, lurgues, hiergue; ---, ---, lierguen. Perfect Definite. ---, 172016; ---
- IMP. Hierga or yerga, hiergue, hierga ; irgamos, ----, hiergan Sca. Present. Hierga or yonga, hierga, niergan, irrganies, Irgals, hiergan.—Inperfect. Irgulera or irgulesa, irrgalies, reguleses, figulera or ingulese; irguleranos or ingulesa, irgulera or irgulesa, irguleranos or irgulesa.—First Future.
- Inguiere, inguieres, argulere : arguiéremes, fraulerers, frauleren, 27. The irregular verb incluir, to include, is thus conjugated :-
- INF. Past Participle. Incluido.—Gerund. Incluyendo.
- IND. Present. Incluye, melnyes, fucluye; ——, ——, luchuyen. IMP. Incluya, incluye, incluya : meluyumos, ——, meluyan. Sun. Present. Incloya, Incluyas, incluya; incluyanos, incluyais, incluyan.—Imperied: Incluyan or incluyes; incluyers or incluyers; incluyers or incluyers; incluyers or incluyers. incluyésemos, incluyérais or meloyéseis, incluyeran or mcluyesen,-First Future. Incluyere, incluyeres, incluyere;
- 28. The irregular verb fr. to go, is thus conjugated :-
- incloyéremos, incluyereis, incloyeren. INP. Past Participle. Ido .- Gerund. Yendo.
- IND. Present. Voy, vas, va; vamos, váis, van.—Imperfect. Iba, ibas, iba; foamos, finis, iban,—Perfect Definite. Fut, foiste, fué ; fuimos, fuísteis, fueron. IMP. Vaya, ve, vaya; 'vamos', id, vayan.
- Sun. Present. Vaya, vayas, vaya; vayamos, vayais, vayan.-Imperfect, Form or fuere, fuerus or fueres, fueru or fuere; foerumos or fueremos, fuerus or fuereis, fuerum or fueren.— First Future. Fuere, fueres, fuere; fueremos, fuereis, fueren.
- -29. The irregular verb lucir, to shine, is thus .conjugated:-
 - INF ... Past Participle. Lucido. -- Gerund. Luciendo. IND. Present. Lunco (no other Persons irregular).
 - IMP. Luzen, -, luzen; luzestnon, -, luze Sun. Present. Luzen, luzens, luzen : luzenmos, luzenos, luzeno,
- 30. The irregular verb oir, to hear, is thus conjugated :-
- INP. Part Participle: Oldo.—Gerund, Oyendo. IND. Present. Olgo, oyes, oye;, oyen.
- IMP. Oiga, oye, orga; olgamos, ---, olgan. Sun. Present. Olga, orgas, orga; orgamos, orgais, organ .-Imperfect, Oyela or oyese, oyens or oyeses, oyen or oyese; ramos or oyesemos, oyerals or oyesers, oyeran or oyesen,
- -First Future. Oyere, oyeres, oyere; oyeremos, oyereis, oyeren. * Sometimes Lagumor, though this form is now seldom'used-

31. The irregular verb producir, to produce, is thus conjugated :-

her, Paul Partleple, Productio, —(zerond, Productede, hm. Prevat, Produces (no other Person (reconter) —Perfet Defaulte, Product, produitste, produje; produjimes, produje tels, produjeron. IMP. Produces, ---, produces; producesmos, ---, pro-

nurcus.

Svn. Pers-al. Produzea, produzea, produzea; produzeames, produzea; produzeames, produzeames, produzeames, produjera en produjeamen, produjeamen produceamen, produjeamen, produjeamen, produjeamen, produjeamen, produceamen, produjeamen, produjeame produjecem — First Fature, Produjere, produjere, produjere; produjecem, produjerek, produjeren.

32. The irregular verb salir, to go out, is thus conjugated:-

Objugantuti —

Ive Jud Parin iple, Saluda — Hermad, Exilumbo

Ive Jud Parin iple, Saluda — Herman French — Jud
Ive Judgan — Herman — Herman French — Jud
Ive Judgan — Herman — Herman — Herman — Herman —

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33. The Irregular verb scatte, to feel, is thus conmented:

Inc. Part Participle, Septido.-Gernad, Stuttendo.

31. The irregular verb servir, to serve, is thus conjugated .--

serviéremes, sers léreis, sirvieren.

35. The irregular verb renir, to come, is thus conjugated :--

—First Switter, Venus, with Venus, we venus, we venus, we venus, who will be venuelable.

If the Arman Venus, venus, venus, venus, venus, we venus, filter, Arman Venus, venus, venus, we venus, venus, we venus, ven

KEY TO EXERCISES.

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* Ex. 30.41. God loves us. 2. The palaters love her. 3. The German loves truth. 4. They rousain contented. 5. You seek German leyes truth.

LAR EDUCATOR.

**Opens, A Tom centilevit sell. 5. To specific Digitals. 6. To present and the control of the co

ello no le respondo. 63, 83 yls hallares libros, yo los terris 98. [Olido] no bròblesco vinio ? 67, [Olido ano Sternes 1 95. Pyccho cra que Marsa no habbaso alto. 66, 25 pesible que no haya llegatio. 76, 25 pesibles que no haya llegatio. 76, 25 pesibles que no haya llegatio. 76, 25 per chiato que no habbera habilido que hibro-71, 38 matinas llegares Pellon, se esselbet. 72, 128 permitta V. lore cen certar 7, 25 mas pretendo no haber habiledo. 74. Habilendo bablicio un litro le 41.

Makemed kalledo un libre is keit.

15. 32—L. How you find primited? 3. The heyeves considerate builty. 3. Ye indexed provides beingly. 4. The first builty of the primited builty. 5. Ye indexed provides beingly. 4. The find the primited builty of the primited builty of the primited builty. 5. The guarant areas builty of the first builty of the f

zu. Lotz wa not meddide in the affaire of the Judge.

Ett. 82.—1. Pedro se ports blem. 2. Te portas blem 6.

Ellas se Jentaron en Mahrid. 4. To annas. 5. La magor se
coccodió. 5. Se follam sub hermanes. 7. Mo alchió. 8. Nonammos. 4. Se hass fortado mal. 16. (Opla se portasos
Digit 1. L. Recondido. 25. Selveno. 12. Abbreo. 18. Abbreo.
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COMPARATIVE ANATOMY.—XI. [Continued from Fol. Fil., p. 575.] ECHINODERMATA (continued).

Iz will be seen that almost all the parts of the ochiums are related disposed, yet the individuals are separate and locemotive. We have, therefore the middle strates which is best smith structure, which he best smith of the control
We might expect that a radiated intimal was a fixed depict libe nipinal falles from off its stall. This we found to be the case with the Medsas, and we could know the tendence the transferentiate in the little stall the stall we could see the transferentiate in the little we may also find it is no, only we have to look not simply to the life history of non-minul, but to trace up this development of the different groups that the stall see that the

geologists. The problem well solved by the site overwy-best of the velocit fossil should parts of the animal vinited, and also of some creating represents, and the site of the tenders of the site of

The star-fall represents conciler type, and although its general from its or different from that although its general from its or different from that although its general from its officers from the star of the star of the star of the star of the one is allied to the other. If we suppose the other is the star of the star of the star of the other is the star of the star of the star of the cown, and fathered out while the intermediate nembrane is supposed to be industrially shorter, or comment in supposed to be industrially shorter, or mentally we should have a fate-fath. All the sinbaleans would be on the under side of the national animal, we should have a fate-fath. All the sinbaleans would be on the under side of the national animal, we should have a fate-fath, all the sinbaleans would be seen to be supposed to the balance would be seen to be supposed to the new two original position. This arrangement is the noted protein plant being the only element left new two original position. This arrangement is

similarity from the cohinus, especially in relation to the elimentary canal. Canal it is not in the proper sense, for some have only one opening, through which the food is both received and ejected. Ten organs-two lying in each ray-empty themselves into the sides of the stomech. The most singular thing is that the starfish, although so nearly allied to the collinus, presents not a troco of the singularly complicated apparatus of laws and tech which we have described as found in the latter animal. Near the colini come the sea-oucumbers, which resemble the cohini in having avenues of tabular fect to walk with, but differ from them in having soft elongated muscular integuments, by the ec tractions of which they move. Sometimes the avenues of suckers in these animals are all brooght together to one side, on which the creature crawls. We have thus an approach to the two-sided arrangement found in the snail. These animals have a curious system for effecting the function of respiration. This is not done by exposing the julces of the bedy to the infinence of the oxygen of the water by protrusions of their membranes externally,

but the water is forced into two origins which ran up into the body, and which are so branched as to be called the respiratory trees. The water is forced into the branches of these trees by means of a muscular buth at the end of the alimentary canal. by a wide, opening, and then injected into the organs. This arrangement is the aquatto represententire of the trached system in insects.

We have no space left to dwell upon the nervous system of these animals, or on the entious development of many of them from larval forms quite mulke in shape from the mature animals, and when the manual manual control of the manual control of

The orders into which the cines is divided, and which we have enreorly described, are thus named:—

1. Crincidea stone-liller, 2. Ophiaroidea britle-stats. 3. Asterloidea stare-fish. 4. Debnoldea sec-urchins.

MOLLUBCA. LAMELLIBRANCHIATA.

We must pass over a number of interesting groups of naimals to devote what remains of our space to the two large and important groups of nuimals which are known as the Mollusca and the Vertebrata. Of the former, the simplest secrete a hard chalky substance in the form of two hollow saucer-shaped pieces, that fit more or less closely together along their edges, and which, therefore, when drawn together, can completely protect the animal, that lies wholly between them, from all injury. Those are called Bivales Melluses. The shells are so united at one point in their circumferences as to play upon that point as a binge, while the remainder of the two sliells can be separated so as to gapo more or less widely on the orestures can keep open house when their guests are likely to be those upon which they can provand can shut their folding doors when they themselves likely to be victimised. These shells are usually thick and heavy, especially in those species which are marine, for the wear and tear of the sen is greater, and the predatory creatures more powerful than those in fresh water. Moreover, the box or house must be tolerably capacions. otherwise the creatures could not breathe while they were in a state of siege, and must surrender at discretion to the expectant lobster or other freebooter of the deep. It follows that this arrangemont is not well suited to locomotion; and not being locomotive to any great degree, they are not

endowed with those perfect organs of sense that must be possessed by those animals which chase When organs of sense are possessed. their prey. tiscy are usually collected on a protruded part of the body, and placed above the mouth, which opens at the front part. Such a projection, which supports the eyes, feelers, ears, and smelling capsules, and contains a nervous centro conveniently and closely situated to these gateways of knowledge, is usually called a head, Now these bivalve molluses are distinguished from the higher orders in having no heads, and are called 'necphalous, They have mouths, and a nerve-knot above this; but the month is not prominent, and lies for within the shelly box, and often between soft projections of the body, which extend some distance boyond it. Their organs of senso are also very poor and

imperfect; and when they are possessed at all, they are placed in other parts of the body. In the Lamellibranchinta, as these animals are called, the double shell is usually finttened us though the erentures had been squeezed by pressure applied to lts sides, and this finttening is called, in the language of Comparative Auntomy, compression. Now, as these passive creatures, whether fixed or free, usually rest on the floor of the sen, it follows that they must lie, not on the edges, but on the flats of their shells ; and when thus lying, they rest habitually on one shell, and this shell is often so modified in relation to the other as to suit the lying posture. A similar instance of this effect of liabit on the two-sided arrangement of the body is seen in the soles, turbet, etc., which constitute the family of fishes called Pleuronectides, as contrasted with the equally fint rays. The depressed rays, lying with their backs apperment, are quite syminetrical; while the soles, resting on their sides, are quito distorted in shape, and the two sides differ in colour. Notwithstanding this tendency to onesidedness in the Lamellibranchinta, due to babit, most of them have nearly equal valves; and la none is the internal arrangement of organs much interfored with.

The Jamellibranchinth are mining thempterised by their breathing organs. They have no fringed arms stretching every from the sides of the meath? by the the treatment of the sides of the meath? and the sides of the meath? and the sides of the sides of the sides of the meather of the sides of

of surface as possible, but also by having gill-tubes, which run through the plates from one edge to the other, through which the water passes. As is usually the case with breathing surfaces in marine

usually the case with animals, the plates are covered, with cilla, whose motion secores a constant change in the water. The gill-, plates are very variously modified in the different families of Lamel-Hormochiats; but

they are constant throughout the class. In se oyster, the mantle sholls and ends at their edges, so that the water has fron ontrance from all In other families the mantic of one side passes oss the aperture of the shell to be united at certain points, or along

families the mustle measure of the shell to be more than sperifier of the shell to be more than sperifier of the shell to be more than sperifier of the shell to be more than the shell to those the shell to those the shell to those the shell to those the shell to th

that handsale attention to the one of the control o

Fig. 23.—LANGEABRANCHAYA.—J. CAROUM. II. DYTO, MED VIEW. III. DYTOINIE. IV. DIADDANGANCH TRADSTEEM SACTION OF A LANGE. CONTINUE. IV. DIADDANGANCH TRADSTEEM SACTION OF A LANGE AND A LANGE OF A LANG

food is passed along the gills to the moath, which is stimuted at the lower end of the burden mollusor.

I be mantle is partly employed in according the shell. It performs this office in a very efficient manner, so as always to allow for the growth of the

the growth of the animal and for the etrenethenine of the shell as the contained animal becomes weighty, and therefore liable to experience more vioent collisions. The method of secrotion is the following :--Round the edge of the mantle lobes, or at that part where they save the shells, are situated a great number of glands, whence secretions of different sub

stances are poured ont and mingled together. These glands secreto horny matter, a large quantity of carbonate of lime, and some pigment. Thus a fresh rim of

size, shape, markings, and colours of the shell are all determined by the edges of this mantle; and the whole of these characters differ so greatly in the different species, and the result is so beautiful in many, that a collection of shells is very interesting. The nucleus, or starting-point from which the formation of the shell proceeds, is called the umbo; and the manner in which the additions are made is very various. Sometimes the mantle edge secretes a great deal of matter at one time of the year, and is nearly inactive, or only pours out a thin socretion. at another; and this will produce a shell with ridges and furrows parallel to the edges of the shell. If the mantle secretes at certain points in larger quantity, and but little between these joints, or if it be folded or puckered, and the folds remain so during the whole of the growth, then ridges and channels are formed, stretching continuously from mbo to margin: If the margin of the mantle is

hard matter is added at intervals to the shell. The

much folded and thrust out during secretion, it sometimes results in long points or projections, which reach far beyond the rest of the outside of the shell. In the same way it will be seen that the lining and colouring of the shell into patterns may be effected by the partial and intermittent secretion of colouring matter. The shell, while it is being extended, is also thickened by a thin secretion poured out all over the external surface of the. mantle, and therefore all over the internal surface of the shell. This latter secretion is always smooth and colourless, or with only a faint unvariegated pink or purple tint. It is, however, sometimes of a pearly lustre; but the rainbow-like tints of pearl are not caused by the absorption of the other kinds of light, as is the case with coloured sarfaces, but from the way in which it is reflected from a very fine 1idge-and-furrow surface, the undalations of which are too small and too close to be seen by the naked eye. The nacre, or lining of the shell, feels perfectly smooth, and contrasts with the roach outside of the shell. The polished internal surface is no doubt constructed as much with reference to the comfort of the animal as the rough and spined outside is to its defence. Indeed, the smooth secretion in some species will soon encrust any foreign body introduced between the mantle and the shell, and hence the origin of pearls, which usually have as their nucleus a grain of sand.

The two valves of the shell are united by the mantle, and at or near the umbo of each valve there is a hinge surface upon which the valyes open. This hinge has often a complex system of teeth, which, while they allow the valves to gape, will not permit them to be shifted or wrenohed aside on one another. Very powerful muscles run directly from shell to shell, and can, when contracted, hold them together with such force that it is impossible to open them without the assistance of an oyster-knife; and as none of the natural encmies of the molluses, except man, possess oysterknives, they are tolerably safe from this kind of forcible entry upon their fortresses. In most lamellibranchs there are two museles to close the valves, one in front and the other hehind; hut in the oyster family there is hut one, and this is near the centre of the shell, and represents the hind muscle of the others. Opposed to these muscles is the ligament which runs from shell to shell on the outside of some species, and lies in a pit in the hidge surface in others. These ligaments have no nower of active contraction as the mascles have, but are passively elastic. In the case of the external ligament, it is in a state of strain when the valves are closed, and opens them when the muscles relax; while in the case of the internal ligament, it is

compressed when the muscles are contracted, and presses the calves apart when they relent.

The mouth is without hard teeth or laws; but it often has large flattened lips. The throat is short, and leads into a roundish stomach; the great peculiarity of this is the long hlind sac which is attached to it, in which is enclosed a cartilaginous rod, the function of which is not known. The intestine twists about in several folds, entering the foot in those bivalves which have a foot, and always ending at the opposite side to the mouth and in the atrial chamber. The foot is an organ of very various development and very various functions in the different species. In some its main office seems to be the secretion of threads by which the ereatures moor themselves to rocks. These threads are formed in a groove in the foot, and one end of the thread, while yet viscid, sticky, and unconsolidated, is applied by the foot to the rock. To this it adheres; and when the foot is pulled back. the thread is pulled ont of its groove and a fresh one made, so that at length a bundle of very strong threads passes from the support to the base of the foot. In other cases, as in the solen the foot is large and broad, and passes out in front of the long razor-like shell by a slit in the mantle, and with this foot the oreature burrows in the sand. In the cockle the foot is long, and can be thrust out and applied to the earth so as to jerk the animal along. In other species it is little else than a musoular investment of the viscera.

For a elassification of the bivalve Mollnsea the reader is referred to Woodward's excellent manual, for the families are so numerous that their characters cannot all be given in this limited, article, and a list of names would be little instructive.

GASTROPODA:

The Gastropoda derive their name from the usual form of the locomotive organ, which is so constantly found, though so variously developed, in the different members of this class. We found the foot in the Lamellibranchiata to be an organ which, in some, secreted the byssus or anchorcable, in others bored holes, and yet in others accomplished jerky movements of the hody. In the swan-mussel of our rivers this instrument is applied to more regular and definite locomotion, and with the foot they may be seen ploughing their way through the soft mud which falls to the bottom of the stream. In their case, however, the foot is a rounded organ, and at its end is something like the human tongue, both in shape and structure. In the gastropods, or belly-walkers, the foot is a flat broad surface placed along the under side of the body, by means of which the animal can

crawl over solid bodies. In some of the lainellibranchs the shape of the foot is much more like that of the human foot than in any of the gustropols; but in function, of course, the foot of the

enstropods is much more like a foot then the same organ in the lower class. Usually the foot is a muscular, elongated sheet, broader and longer than the body of the animal, and acts at the same time as the wall of the body and the means of propelling it along. The whole rim of the foot all the way round is usually thickened, and can be closely applied to a smooth surface, while-the central. parts can be thrown in wrinkles. Thus the whole acts as a kind of sucker or holdfast, while all the middle parts, being alternately applied to the ground and dragged over it, offect a movement in which the whole animal partioinates. If the reader allows a slug to crawl up a pane of glass, and looks at it through the transparent medium. ho will see successive waves moving all along the foot, showing that, while a series of points are fixed, the parts in between are moving, and the moving parts then become fixed, allowing the previously fixed parts to be pushed or pulled along by the contraction of the mascles embedded in the skin. Such a mode of progression, which may be called piecemeal, is, of course, very slow, but it is sure; and how should an animal without limbs move over a solid surface otherwise? Associated with this power of definite locomotion, slow as it is, the whole organism is modified.

Let us suppose that a lamelilbranch had the under part of its foot flattened into a bread museular sheet, expedie, not of pushing through soft mud, but of gliding over smooth rock; how could it make use of its new power of, locomotion? It would, in the first place, be humored with two immerse shields.

manipuled wint was minible simple singular which being ample enough to close upon its whole body, which exhibitly larve their odges danged over the control of the simple
and we may judge that the bracks of travel would be quite outweighed by its Gaugers and troubles. In the gastropods there is only one shall, and it is drawn out in an upward direction, so that, while



Fig. 34.—PULMONATA,—I. ARION (THE BLACK SLEE), II. AGATHINA MACRITANICA, III. OFCIOSTORA ELFOANS, IV. DIAGRAM OF THE CIRCULATION IN A SNAIL. Refs. to Nos. in Figs.—I. 1. orition of lung-chamber: 2, anns. II. 1, threat:

Bofa G. Nov. In Fig. — I. v. ortileo of Imp. clamber ? S. anns. II. I. Jurest J. 2, stronney ? S. Interfaces ? a sum 5 , liver? 6, op lemonary clamber of the control of

the more deliente organs are securely lodged, the edges of the shell's mouth are withdrawn from the ground.

The gills are removed out of harm's way in a singular manner. Those on one side (usually the right) are brought right up and placed on the animal's back, and there enclosed by a fold of the leathery skin, being-placed partially in the last or largest part of the shell cavity, while those of the other side are entirely aborted or dispensed with.

This arrangement gives a one-sidedness to the animal, and, perhaps, is the determining cause of the shell being made more compact in the method peculiar to gastropods, namely, by being twisted into a one-sided spiral or helix, as it is technically called. The head, with its feelers, eyes, and ears, can be thrust out from the shell and stretched well forward, so as to gain some acquaintance with those external objects which come within the line of march. How the lamellibranch may possibly have been modified into the gastropod is shown by placing side by side some intermediate forms between the more typical turbo and the river-mussel (Unio). In patella (the limpet) it will be seen that the gills are still on both sides of the animal, as are also the muscles; though these have no longer the office of closing the shell. , which in this case is consolidated into an equilateral cone. In the bonnet limpet one side of the breathing organs has been aborted, while in turbo both the breathing apparatus and muscles of one side are gone, and the whole animal is twisted in its upper part into a one-sided spire. In this case a rounded horny plate is developed on the upper part of the foot, or rather tail of the creature, and this, when the animal pulls back its head and thin foot into the shell, closely closes the aperture. This . operaulum, as it is called, is supposed to be the representative of the horny byssus of the bivalve. being, as will be seen, similarly situated.

ITALIAN . - XIII, [Continued from Vol. VII., p. 350.] .

IRREGULAR VERBS OF THE SECOND CONJUGATION (continued).

' II, IRREGULAR VERBS ENDING IN -erc SHORT (cont.), THE irregular verb opprimere, to oppress, is thus

INDER. Simple Tenses.-Pres. Opprimere, to oppress.-Pres Gerand. Opprinendo, oppressing.—Past Part. Oppresso, oppressid.—Compound Tenses.—Past. Avere oppresso, to here oppressed .- Past Gerund. Avendo oppresso, having oppressed IND. Pres. Opprano, opprima, opprime; opprimiamo, oppriméte, opprimono -- Imp. Opprimeva, opprimevi, opprimeva; opprimevano, opprimevate, opprimevano, -- Ind. Pret. Opprime. opprimesti, oppresse; opprimemmo, opprimeste, oppressoro.--Fut. Opprimerò, opprimerai, opprimera; opprimeremo, oppri-merète, opprimeranno.—Cond. Pres. Opprimeré, opprimeresti. opprimeroble; opprimerémme, opprimeréste, opprimeréb-

IMP. Opprimi, opprima ; opprimismo, opprimeto, opprimano Sun. Pres. Che opprima, che opprima, che opprima; che opprimiamo, che opprimiate, che opprimano.—Isp. Che opprimessi, che opprimiassi, che opprimiassi, che opprimiassi che opprimia che oppriméste, che oppriméssero,

After this example conjugate the following :-



The irregular verb porre, to put, is thus conjugated :---

'INDER. Simple Tenses.-Pres. Porre, to put.-Pres. Gerund. Ponésido, putting.—Past Part. Posto, put.—Compound Teners.—Past. Avéro posto, to have put.—Past Gerund. Avéndo

posto, haring put.

Ind. Pres. Pongo, poni, pone; popiamo, ponete, pongono.— Jam. Tons. rough, jonn, jeun; jamin, jonnen, ponter, pengenoJup. Roners or ponen; ponervi ; ponerv, ponen, or ponia.
Ponen finic; ponervie; ponervo ; ponervo, ponen.
Junetati, pose; ponemuo, ponete, pósero.—Fal. Porró, porrál,
porrál; porréleno, porréle, pomismo.—Cond. Pres. Porré opporría, porréla; portéble or 'porría; porréla; porréla; porrébbero.

IMP. Pôni, pônga; popisino, ponéte, pôngano. Sun. Pres. Che ponga or pogne, che ponga or pogni, che onga or pogna ; che poniamo, che poniate; che pongano.—Imp. . Che ponéssi, che ponéssi, che ponésse; che ponéssimo, che

poneste, che ponessero. . After this example conjugate the following :--

Frapporte, to interpe Comporre, to compo Disporre, to dispose Riporre, to replace.

The irregular verb trarre, to draw, is thus conjugated :-

INDER. Simple Tenses.-Pres. Trarre, to draw,-Pres. Gerund. Traindo, drawing.—Past Part. Traito, drawn.—Compound Teness.—Past. Avere tratto, to have drawn.—Past Gerund. Avéndo tratto, having drawn.

IND. Pres. Traggo, trái or traggi, tráe or trágge; imagiamo, tracte, trággono or tráuno.—Imp. Traéva or traéu; traévi; traéva or traés. Traevámo: traeváte: fraévano, traépo, or traéano,-Ind. Pret. Trássi, traésti, trasse; traémmo, traéste, trassero.—Fut. Trarré, trarrái, trarrá; trarrémo, trarréte, trarráno.—Cond. Prez. Trarréi or trarría, trarrésti, trarrébbe or trarria; trarrémmo, trarreste, trarrébbero.

IMP. Trát. trácza : tratémo or trauciómo, traéte, tráccano, Sun. Pres. Che tragga, che tragga, che tragga; che tralamo or traccismo, che traiste or tracciste, che traggano,-Imp, Che traéssi, che traéssi, che traésse; che traéssimo, che traéste, cho traessero.

After this example conjugate the following:-Attricre, to attract. Ritrarre, to draw or

Sottrarre, to subtract

Contrarie, to contract Distrarie, to take of. The irregular verb scrivere, to write, is thus con-

jugated :--IMDER, Simple Tenses.-Pres. Scrivere, to write,-Pres. Gerund. Scrivendo, writing .- Paul Part. Scritto, writen .- Compound Tenses,-Past. Avere scritto, to have written .- Past Geruna. Avendo scritto, haring written.

IND. Pres. Serivo, serivi, serive; serivismo, serivete, serivono. -Imp. Serivéva or scrivéa, serivévi, scrivéva or scrivea ; serivevamo, serivevate, serivevano.-Ind. Pret. Berissi, serivésti, serisso; scrivemno, scriveste, serissero:-Fut. Seriverò, scriveria, scriverà; scrivéremo, scriverète, scriveránno.—Cand.

Pres. Scriverei, scriveresti, seriverebbe ; scriveremmo, scriveréste, scriverebbero.

IMP. Scrivi, scriva ; scriviamò, scrivete, scrivano. Sun. Pres Che seriva, che seriva, che seriva; che seriviamo, che seriviate, che serivano.-Imp. Che serivesti, che serivesti, che scrivene; che scrivessimo, che scrivesto, che scrivensero

After this example conjugate the following:-

Circonscrives, to circusacribe. Riscrivere, to serite again.
Continuerivere, forerite against Society or Descrivere, to diderbe. Society or Society or Society or Society or Society of Society of Society or Soc

priscrivere, to put the direc-Preserivere, to preseri Preserivere, to preseri Proserivere, to proser Trascrivere, to transcribe. The irregular verb vivere, to live, is thus con-

jugated :-. INDER. Simple Tenses .- Pres. Vivere, to lire .- Pres. Gerund.

Vivendo, living. — Past Part. Vissuto, ifced. — Compound Tenses.—Past. Avere vissuto, to have lived. — Past Gerund. Avéndo vissáto, having livel.

Inc. Pres. Vivó. vivi. vive; viviámo, vivete, vivono.—Imn.

Viveva or vivea, vivevi, viveva or vivea; vivevámo, viveváte, vivevano or viveano .- Ind. Pret. Visal, vivesti, vives ; vivemmo. viveste, visaero.-Fut. Viverò or vivro, viveral, viverà; viveremo, viverete, viveranno,-Cond. Près. Viverei, vivrei, or viveria ; viverésti ; viverébbe or viveria. Viverémmo, viveréste, víverébbero.

IMP. Vivi, viva : viviámo, vivéte, vívano. Sun, Pres, Che viva, else viva or vivi, else viva; che viviamo,

cise viviáte, che vivano.-Imp. Che vivéssi, cise vivéssi, che , vivésse; che vivéssimo, che vivéste, che vivéssero.

After this example conjugate the following:-

Convivere, to live together. Benvivere, to live well. Sorvivere, to surrive. Sopravivere, to survive. Benvivere, to live see Rivivere, to revire.

TRREGULAR VERBS OF THE THIRD CONJUGATION. The irregular verb finire, to finish, is thus con-. . . 2 jugated :-- "

· Inder. Simple Tenses .- Pres Finirs, to finish .- Pres. Gerund. -Finendo, finishing.—Past Part. Finito, finished.—Compound Tenses.—Past, Avère finito, to have finished.—Past Geruml. Avendo finito, having finished.

Ixn. Pres. Finisco finisci, finisce ; finiamo, finite, finiscono. Imp. Finiva, finivi, finiva; finivamo, finivate, finivano.-- Ind. Pret. Finii, finisti, fini: finimuno, finiste, finirono.—Fut. Finitè, finimi, finirà ; finirèmo, finirète, finirano.—Cond: Pres. Finirès, finirésti, finirebbe ; finirémmo, finiréste, finirébbero.

IMP. Pinisci, finisca; finiamo, finite, finiscano Sun. Pres. Che finisca, che finisca, che finisca; che finiame,

che finiste, che finiscano.-Imp. Che finissi, che finissi, che · finisse; else finissimo, che finiste, che finissero. After this example conjugate the following:-

Abboilire, to cm. Defertre, to defer. Gestire, to gestica-Abbonites, to perfect. Benolite, to define Illaidire, to gross Bandler, to bandes, if the Benolite, to define Illaidire, to gross Brustire, to barnish. Emulire, to benolite, to make the same to be the same to th ndire, to candy. Essurire, to exhcust. fy.
Garantire, to war- Intituire, to insti-Chiarire, to expense. Custodire, to guard. rant 1 . .

Istraire, to instruct.

Largure, to gire.

Largure, to gire.

Langure, to ex-saff.

Langure, to gire.

Langure, to ex-saff.

Langure, to gire.

La

The defective verb fre, to go, is thus conjugated:-INDEF. Pres. Ire, to go .- Past Part. Ito, gone.

IND. Pres. Ite, you go.—Imp. Iva, I was going: ivano, they seere going.—Fut. (plur.) Iremo, irete, iranno.

IMP. Ite, go ye. The irregular verb uselre, to go out, is thus con-

jugated :-INDER, Simple Teuses,-Pres, Usefre, to go out,-Pres, Gerund,

Uscendo, going out.—Past Part. Uscito, gone out.——Compound Tenses.—Past. Essero uscito, to have gone out.—Past Gerund. Evidado uscito, haring gone mit.

IND. Pres. Esco, ével, esce; uscláuno, uscite, éscono.—

Imp. Usciva or uscia, uscivi, useiva or uscia; useivamo, nscivâte; uscivano, uscisno, or uscieno .- Ind. Pret. Useil or usel, useisti, usei or uscio; uscimmo, useiste; uscirono, DSCITO, OF HISCIT.

The irregular verb renire, to come, is thus couiugated :-

INDER. Simple Tenses -Pres. Venire, to come .- Pres. Gerund. Venendo, coming .- Past Part. Venuto, come .- Compound Tenses.-Past. Essere venuto, to have come,-Past Gerund. Esséndo venúto, kaving come.

IND. Pres. Véngo, viéni, viêne ; veniámo, venite, véngono.— Imp. Veniva or venia ; venivi ; veniva or venia. Venivámo ; vemvsite; venivano, venieno, or veniano.—Iud. Pret. Vann, venisti, venne; venimno, veniste, vennero or veniro.—Fut. Verro, verrai, verra: verremo, verrate, verranno,-Cond. Pres. Verréi or verria, verrésti, verrébbe or verria ; verrémmo, verréste, verrébben IMP. Viéni, vénga ; veniámo, venite, véngano.

Sun. Pres Che vénga, che vénga, che vénga; che venidmo, che veniate, che vengano.—Imp. Che veniati or venesti, che venissi, che venisso; che venissimo, che veniste, che venissero.

After this example conjugate the following :-

Avvenire, to happen. Convenire, to agree. Divenire, to become. Invenire, to find. Pervenire, to attain. Rivenire, to return. [pectelly. Sopravvenire, to come unex-Svenire, to faint away.

IMPERSONAL VERBS The following are impersonal:-

Baléna, it lightens. Dilàvia, it rasus Nevica, it snows.
Bisogna, it is necessary.
Giliaccia, it freezes.
Grindina, it hells.

Collinacia, it thans.

Several other verbs become impersonal. They are as follow:-

Appartiène, it bélonge. Avviéne, it happens. Conviène, it is convenient. Básta, it suffices. Importa, et concerns. Léce, et is permetted. Páre, et seens. Cé or v'è, there is.

CONJUGATION OF THE IMPERSONAL VERBS. The impersonal verb bisegnare, to be necessary,

is thus conjugated :--Inder. Simple Tenses.-Pres. Bisognare, to be necessary,-Pres. Gerund. Bisognindo, it being accessory.—Past Part. Bisognito, needed.——Compound Teness.—Past. Avine bisognato, to have needed.—Past Gerund. Avindo bisognato, having needed. Inp. Pres. Bisógna.—Imp. Bisognáva.—Ind. Pres. Bisognó.
—Ful. Bisognerà.—Cond. Pres. Bisognerèbbe.

Sun. Pres. Che biségni .- Imp. Che bisognésse.

THE PARTICIPLE.

The participle is a word which possesses the qualities both of the verb and the adjective. The present participle terminates in -ando or -éndo, as---

Amándo, leving. Credéndo, beliering. Servendo, serving.

The past participle ends as follows in the regular verbs :--

Amato, -a, amáli, -e, lored. Creduto, -a, ereduti, -e, believed. Scrvito, -a, serviti, -e, served.

The participle future is not so often used. It is as follows :-

. Avère ad amère, essère per amère, èsing about to lore. Avere a crédère, éssere per crédère, bring about to beliere. Avère a servire, essere per servire, bring about to serve.

The Italians are accustomed to syncopate several, past participles of the first conjugation, as-

> Acconcio for acconciáto, avvezzato, caricato, carespato, destato, fermato, Avvezzo Cárico Créspo

Génflo Lácero Macero Nétto Pago Privo Sálvo Sálvo Sázio -;; gonfiato, lacerato, macerato, nettáto. . pagato, privato, salvato, saziato. ., ,11

THE ADVERB.

The adverb is a word generally joined to a verb. participle, or adjective, to express some circumstance, quality, degree, or manner of its signification.

FORMATION OF ADVERBR.

Italian adverbs are formed from adjectives in three ways, viz :--By uniting the substantive ments to the feminine

of the adjectives ending in a: as-Dottamente, learnedly. Dôtto or dôtta, learned 2

By adding the substantive ments to the adjectives ending in e not preceded by I; as-

Diligentemente, diligently. Dilicente, dellorat: By joining the substantive ments to the adjectives ending in lo and re, which lose their e; as-

Facilmente, easity. Particolarmente, particularly. Fácile, easy : Particolare, particular ;

Exception-Male, bad, makes malamente, badly.

VARIOUS KINDS OF ADVERBS. In questo instante, in questo questa mane, questa matina, punto, in tempo, this moment, sta mane, sta matina, this morning.

Presto, quick.

E grau pézzo, é lunga pézza, e unolto, è un pezzo, it is u long ego. La constitución de l domání důnque, to-morrose Doman l'ultro, the day ofter

to-morror. D'om invanzi, kenceforward. Postománi, the day after tothen.
All'avvenire, in future.
Da qui a due mési, in two
monthe time.
Donnin a otto; to morrow week.
Donnin a quindici, to morrow
fortnight. morrae. minto prima, as soon as possible.

portulght.

Al phi presto, at the somest.

Di bel madro, opern.

Di botto, endemig.

Di botto, endemig.

Di continuo, continually.

Di continuo continually.

Junta continually.

i rido, seldon. in adesso, fin a quest' ora, fin ora, hitherto.

Accinto or a cinto, by the side.

A destra, on the right.

Al di là, offer, beyond.

Altrove, somewhere clas.

Da ogni dôve, da ogni parto,
on all sides.

Dappertatto, in ogni parte, Dapperente, in ognievery way.
Déntro, in or inside.
Di diétro, from behtsd.
Di ll, lk, from thenez.
D'intoino, all around.
Dôve, where.

quindo, till seles Alla rinfúsa, sociópra, topsy- In segulto, di séguito, afterturvy. A vicenda, atternately. Dipôl, then.

Abbondantémente, abund Alméno, et least. Jiren, abons. Méno, less. Niénte affitto, not et all. Per meti, by half.

A brigha sciolta, of full speed. A caso, by chance. A cavalcioni, astraidile. Accortamente, sagaccinente,

cunningly. I dirotte lagrime, bitterly. Agevolmente, early. Agevolments, early.
Alla storditta, of rundom.
A metate, by heart.
Annie buvolmento, omicably.
A profit, on foundation.
A proving a constation.
A proving a constation.
A proving a constation.
Bel bellto, adagio, softly, geni
Carpóno, upon eti Jones.
Con arto, errfelly.

Certamente, di certo, per certo, certatuly. Davvero, veramente, truly.

Giornaliuênte, ilaily. In breve, in biéve tempo, skorlly. in quel mentic, in the meanfine. In un sitimo, all at once. In un batter d'occhio, all of a sudden.

Mai, never.
Mentie, whilst.
Non aucora, not yet.
Per tempo, carty.
Quando, when.
Tosto, or presto, soon.

Fin là, till there. Fin là, till there. Fudri, ont. In disparte, a parte, da parte, In disparte, n parte, da parte, da banila, aside.
In già, dossa.
In già, dossa.
In già, dossa.
Là, là, colà, there.
Là, là, colà, there.
Là, là, colà, there.
Stà dive, how far.
Stà ndive, how far.
Stà la Alto, di sopra, above or

teards.

Prime or primieramente, first.
Sopratusto, alose all.

Quast, almost.
Totalmento, del tatto, entirely.
Troppo, too seuch.
Un poelectino, a little, very
little. Un pôco di méno, a little less. Un po teoppo, a little too much. Un tantino, a little piece.

Da parte a parte, da binda a banda, through. Da senno, is good carnest. Di mila voglia, uncollinely, Fuor di luogo, anexasomeby, Ginstanente, purly. In dúbbio, in doubt.

Malgrado mio, in spite of me. Mirabilmente, a maraviglia admirably. Per forza, mal volentiéri, colle Per form, and volentier, colle-cative, against ones will.
Per il rovescio, the wrong side outward.
Smisuratamento, beyond mea-Supino, on ones back. [sure. Temerarismento, rashly.

In constitute, on my constitute.

Non v'e dúbbio, non v'ha
dúbbio, there is no doubt.

Si in vērītā, yez, indeed.	Senza fallo, without field.	Dio mi benedica t Dio mi sal-	Annuo sa l Acer un/
Affatto, assolutamente no, by	No, no or not.	vil misericordia! God bless	Configure ! contage?
	. Pao darsi, può essere, it may	Dio buono! oh che giorno!	Cappen: capputa; cappiten-
	be.	Gran Dio I good Hearen!	na! canchero' carcintra!
A guisa, a módo, lile,	Via più, viappiù, vie più, viep-	Oh Dio t oh Hearen!	heyday '
	piti, still more.	Oimė į alas ' Sta i stop!	Oh! ah/
Piu tosto, jauttosto. rather.	••		Aht oht
.THE PRE	POSITION.	JOY AND DESIRE. , -	Per baccot upon my rord!
Mb - was soldier is a way	rd placed before the nouns	Ohlahi Oloki	
and preposition is a wo	governs, and before some	Bene t well! Buono t good '	CALLINO.
		Ah 1 ah t ah t ah t	Ela! oh, oh! halloo!
	with one another, and to	Ahlah/	Eld! olh! here!
show the relation betwee	n them.	Víva, víva! ch víva! evvíva!	Al fuoco ! fire! Aluto ! kelp, kelp!
DENOTING THE CAUSE AND	Diétro, behind.	long live!	All'armi I to arms!
MEANS.	Fra, between,	O che allegrézza! allegrézza, allegrézza! oh, schat joy!	
Atteso, per englone, consider-	DENOTING PLACE.		WARNING.
		APPROBATION OR APPLAUSE,	Badate I gudrda I largo, largo I ohe, ohe I take core!
Per mezzo, mediante, by, by	In, in, or into.	Béne ! well '	
means of, for, on condition.		Vn bene 1 very well ! Cost, so!	Ecco! eccoti! brhold * lo!
Da, dal, per via, per, by,	Setto, under.	Si ! ves /	Álto i halt' stay! Vía i viz i quan! awan!
	Sopra, on or upon.	Ma piáce ! reru scell /	Senti 1 odi ! adagie ! softly !
DENOTING THE OBJECT.	Verno, forwards.	Viva i ch viva ! harrah !	
Vérzo, to, towards.	DENOTING SEPARATION,	· Bravo! bravissimo! braro!	RALUTATION.
Per, for. [1ng. Curen, about, concerning, touch-	Eccetto, fuorche, salvo, tranne.	Buono 1 good?	Sálve! salvéte! hail *
	trattone, except.	ENCOURAGING.	SILENCE.
DENOTING OPPOSITION.	Bénza, without,	Su présto i via ! su via ! via	Sta. sta ! zitto ! tacéte ! negos
Contro or contra, against.	DENOTING UNION.	su' orsu! ánimo! come on!	there!
- Malgrado, isi spite of. Nonostante, notwithstanding.	Con or col, with	come then '	Silenzio i cheto i silence!
	Durante, in tempo, ouring.		
DENOTING ORDER.	Oltre, lesides.		
 Avanti or prima, before. Dópo, after. 	Secondo, conforme, according	REMARKS ON	
		. THE DEFINIT	TE ARTICLĖ.
· THE CON	JUNCTION.	The definite article (1 1	o, la, the, must agree with
The conjunction is a v	word used to connect one	nouns in gender and num	
word with another, and s			
word with abother, and s	entences with sentences.	The definite article il.	lo, la, the, is suppressed

Ancorche, benche, comeche, Onde, dirione, adunc though.

Tuttavia, pure, per altro, yet. Per tanto, in the meantime.

-o, sia che, either, or. ppure, ossia, ovvero, or, or else, either. since. Altrimente, otherwise Eziandio, also. In oltre, beside

A fine, affine, in order. A cagnone, on condition. Peroceles, perciò che, therefore.

THE INTERJECTION.

The interjection is a word which serves to express the different affections of our mind. They may be divided as follows :---

ADMIRATION. APPLICATION OR ORIGH. Oh! oh! oh! oh!

AVERSION, CONTEMPT, AND

Oh vergögna! fie, for shame! Ohbo! Ofie! Eh via! puh! fih! pish! Andate, andate! go, go! Deh! ek!

Aimė i obnė i ohimė i lásso i

ibò i ciáncie i fiddiestick / la via i pshaw /

PEAR, Su, su' new then?

before nouns taken in a general, proverbial, usual sense, before the number of a chapter or a page, and before the title of any literary performance.

The definite article il, the, is suppressed before numbers denoting the succession of sovereigns.

THE INDEFINITE ARTICLE.

The indefinite article uno, una, un, a or an, must , agree with nouns in gender.

The indefinite article uno, una, un, a or an, is repeated before every Italian noun.

THE PARTITIVE ARTICLE.

The partitive article di, del, dello, della, some, is used to express a portion or a part of anything. The Italians use no partitive article when they express the quality or species of a noun taken in a

general sense. NOUNS.

When two nouns in English are united by the preposition of, di is used before the latter if it requires no article; but if it does, it is preceded by del, dello, della.

'If in English a noun is in the possessive case, and followed by another noun, in Italian the former is placed after the latter, preceded by di, del, dello, della, or dei, etc.

When two nouns are joined together in English, forming a compound noun, and showing the matter of which a thing is made, the preposition di is put between the two nouns.

ADJECTIVES.

The adjective in Italian agrees in gender and number with the substantive to which it refers.

When an adjective refers to several nouns of inanimate objects, without being separated by a verb, it agrees with the noun next to it.

COMPARATIVES AND SUPERLATIVES.

COMPARATIVES. When, in a comparison, than is followed by an

article, or a possessive pronoun, it is expressed by the definite articles del. dello, della, dei, deali, delle. . Whon a comparison is made between two adjectives, substantivos, or adverbs, following one another,

than is expressed by che; and if there is a verb after than, this conjunction is rendered by che non. When as much as, so as, are employed in a com-

parison, they must be rendered by quanto.

SUPERLATIVES.

The relative or absolute superlatives are placed either before or after their substantives.

NUMBERALS

THE CARDINAL NUMBERS.

The cardinal numbers are placed either before or after their substantives.

THE ORDINAL NUMBERS. The ordinal numbers are placed before their nouns, and agree with them in gender and number,

and take an article. The ordinal numbers employed for quotations are generally put after their nouns, without an

PERSONAL PRONOUNS.

article.

When the personal pronouns io, tu, noi, vei, are the subjects of a discourse, they may be left out; but egli, ella, eglino, elleno, esso, essa, essi, esse, must be expressed in order to distinguish the gender.

ITALIAN FORMS OF ADDRESSING PERSONS.

The Italians in speaking or writing to persons of both sexes, whom they wish to treat with great respect, make use of the title Vossienoria." or Vostra Signoria, your lordship or ladyship. As this flattering title is in the third person of the feminine gender, it requires the verb in the third person, and agrees with the adjective or past participle.

To avoid the repetition, or better to avoid the

* This word is seldom used in polite society. † In conversation especially, Foreignoria pr Fostra Signoria, is now very seldom used.

word rossignoria, the Italians make use of ella, as is seen in the following illustration :-

Singular (for both Genders). Possignoria, V. S., or clla, you (sir or madem)
Di vossignoria, V. S., or all lel, of you
A vossignoria, V. S., or a let or le, to you,
Vossignoria, V. S., or a let or le, to you,
Usasignoria, V. S., or de or la, you.
Da vossignoria, V. S., or da lei, from you.

·: Plural.

Lor signore, you. Di lor signore, of a MARCULINE AND PEMININE.

Le signorie loro, or elleno, 90n.
Delle signorie loro, or di loto, of 30m.
Alle signorie loro, or a loto, to 10m.
Le signorie loro, or loro, le, 90m.
Dalle signorie loro, or din loro; from 90m.

EXAMPLES.

Ella mi disse che em soddis- Sono lor signori stati in cam-fatta, non told me that you pogua? have you been in the country, graftemen? Come sla V. S. or ella? hope do Ito veduto le sue sorelle, I ou do, sir, or madau f ringrazio V. S. or lei, or io ringrazio, I thank you, sir,

Parents to their children; husbands to their wives; brothers, sisters, cousins, intimate friends to each other-all make use of the second person singular. Poets, and people in a passion, do not fail to employ it.

POSSESSIVE PRONOUNS.

The possessive pronouns are generally preceded by the definite article il. le. or la.

The possessive pronouns must agree in gender and number with their substantives.

The possessive pronouns may be put either before or after the substantives with which they agree. The possessive pronouns preceded by onni qualche,

alvuno, molto, questo, quello, quegli, uno, due, tre, have no article. No article generally precedes the possessive pronouns when the latter are prefixed to substantives which express (1st) kindred or relation, such as padre, madre, figlio, sorella, marito, etc.; (2nd) the

rank and quality, such as alterra, eccellenza, maostà, etc. When the possessive pronouns follow the above

substantives, padre, madre, etc., or precede the same in the plural, then the article is used. Speaking of any part of the body, whole, sick, or wounded, instead of the possessive pronouns as in

DEMONSTRATIVE PRONOUNS.

English, the Italians use il, lo, la.

The demonstrative pronouns he who, she who, they who, are expressed by colui she or chi, colci che, quelli ake, quelle eke, and that which or what by ciò chc.

RELATIVE PRONOUNS.

The relative pronoun who that, or which is expressed in Italian by che, when it is the subject or regimen direct of a verb, or by di out, a out, daout, when used in the genitive, dative, or ablative

The relative pronoun guals, used for persons or things, is declined with the article il or la, and agrees with its autocedent in gender and number.

ENGLISH LITERATURE.—XIII.

THE ELIZABETHAN PERIOD: THE DRAMATISTS. MASSINGER, FORD, WEBSTER, AND OTHERS. PHILIP MASSINGER was born at Salisbury in 1584, and was the son of a gentleman who had long been employed in the household of the Earls of Pembroke. He spent some years at Oxford; but after the close of his course there he seems, probably under the pressure of poverty, to have at once dovoted hinself to the dramatic profession. At the beginning of his career it seems likely that he followed the common course of writing in concert with others; and having established his reputation by this means, he probably advanced to purely independent authorship. It is plain that he lived in great poverty; and from his works there can be little doubt that he must have become a Roman Catholic at an early age, and continued in that creed through his life. But beyond this wo know nothing of his personal history. Ho died in 1640 Massinger is unquestionably entitled to a very

high place among the Elizabethan dramatists. In the creation of life-like characters, in insight into human nature, in the expression of passion, in the power of pathos, and of arousing our sympathy for the errors and weaknesses no less than for the virtues of lumanity, he falls short of many of his contemporaries. His skill lay more in dehis contemporaries. His skill lay more in de-pioting the lection virtues. In bis greatest plays, and those which most pewerfully impre reader, we generally feel more of admiration for the fortitude than pity for the sufferings of the the judgment than won through our emotions. The stories of Massinger's plays are seldom original, but stories of anisoning a pany and the plots are carefully worked out; there is too often, however, a want of unity of offeet, a want of harmony between the various parts of the play. Massinger's language and versification are wonderfully perfect. His versification combines smoothness and melody with case and variety to a degree which has never been surpassed; while his style is

clear and unaffected, but at the same time dignified and impressive. His learning may easily be traced, but is meer obtraced upon us. In one respect Massinger stands above almost all his brother dramatists—that is, in the religious spirit and the purer tone of morality which pervade his plays. Yet he is not free from the one all-prevailing vice



Comment of Advancers

of his ago—the introduction of scenes of the lowest and corresset buffconcery, unredeemed in his came by a single spark of wit or humour, and for the most part more purposeless coroscences upon the plays in which these objectionable interpolations occur.

Sighteon of Massinger's plays have been preserved, and a still larger number have perished. Those which remain to us are of very various chasses.

Charles (Tryle Merley (1982) demands particular notice, not only because it is now of the plays by which the name of Massiager is best known, but because it is over different in clamater from any control of the plays of the name of th

includes of the condition in Casarean are Angello (on angula passing as the page of Downburgh and Harpers, angula passing as the page of Downburgh and Harpers, and the page of Downburgh and Harpers, and the second of the Angula Passing of the Casarean and the Casarean angula Passing of the Casarean angula Pas

there are a considerable number among Massinger's plays. The finest of these are probably The Duke of Milan (1623), The Unnatural Combat, and The Fatal Doory; and we can hardly recommend to the student a better example of Massinger's powers in tragedy than the last-mentioned of these plays. It opens with several very powerful scenes, in which the hero. Charalols, is introduced in extreme distress, sacrifloing his own liborty to save his father's corpse from his exacting creditors, and eccure for it the common decencies of burial. He is rescued from his onlamities, and his debts are paid by the noble and wealthy Rochfort, who crowns his noble and wentty recently, was stormed in favours by giving his daughter in marriage to Chambols. 'The infidelity of Beaumelle, the vengeance of her husband upon herself and her paramour, Novali, and the death of Charalois at the ands of Novall's friend, form the story of the play. Painful as that story is, the mode in which it is conducted is characteristic of Massinger. There is no tampering with the bounds of right and wrong; none even of that gross and animal character about the heroino's fall which we so often find in Fletcher's plays. The husband whom Benamelie wrongs is not the busband of her choice, but a stranger imposed upon her by her father's will. The man for whom she sacrifices her honour is the man whom she had leved before marriage. Her repent-ance and her punishment are rapid and thorough. Nor is Bers the only character in which similar principles are to be traced; the moral leasons of the play are in all cases clear and true. The following lines from the speech of Charalois to his judges, when arraigned before them for the death ie wife and her paramour, afford a good example of Massinger s.style :-

The hampopretailey value of slaves or within. Of the death of the guilty rival his mays— "For the least, as of The former, I confine it: that with value The former, I confine it: that with value To or pire would these to an one of the property To or pire would these to an one often growth To or pire would these to an one often growth To or pire would these to an one often growth To or pire would these to an one often growth To or pire would be the pire of the pire of the pire The to any wife, is may of our Presch contribit, The offen growth of the state of the pire The or pire of the pire of the pire The or pire of the pire of the pire The offen of the pire of the pire of the pire This of the pire of the pire of the pire This of the pire of the pire of the pire This of the pire of the pire of the pire This of the pire of the pire of the pire This of the pire of the pire of the pire This of the pire of the pire of the pire This of the pire of the pire of the pire This of the pire of the pire of the pire This of the pire of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire of the pire The offen death of the pire The offen deat

FORD.

Somewhat similar to Massinger in the character of his genius was his contemporary, John Ford. He was born in 1586, of a respectable Devonshire family. In 1602 he became a member of the Middle Temple, but it does not appear that he ever actually joined the bar. It is clear, from the dedications prefixed by Ford to his various plays, that literature was not his sole pursuit in life, though what his other employments were cannot be certainly ascertained; and as he had wealthy and influential connections, being the grandson on his mother's side of Popham, the Chief Justice of England, it is- probable that he never felt the burden of poverty under which most of his fellowdramatists laboured. These circumstances, together with a sensitive and reserved disposition, are quite sufficient to explain the fact of Ford's having written comparatively few pieces for the stage. Those which he has left us are, however, abundantly sufficient to stamp him as a great dramatist. Tho bent of his genius is essentially tragic. In depicting blighted affections, disappointed ambition, in everything that appeals to our pity, he is masterly. In wit and humour he is wholly deficient. His ' language and versification have a peculiar power and beauty, and are admirably adapted for conveying those images of tenderness and pity in which he delighted. The plays of Ford which will . probably give the greatest pleasure to most readers are the historical play of Perkin Warbeck, The Broken Heart, and a play frightful in subject, but singularly powerful and noble in execution-Annabella and Giovanni, known also by several other names.

WEBSTER,

The genius of John Webster was one of the most striking in its character, even more than in its power, among all those that adorned the Elizabethan age. Of Webster's personal history we know nothing; the time or place of his birth or of his death, his parentage, the circumstances of his life, his social position and habits, cannot be ascertained. And this is especially disappointing in the case of one whose works are marked with so strong an individuality as Webster's. We merely know of him that he was a contemporary of Massinger, Ford, and the rest of the younger school of Elizabethan dramatists. There is little doubt that he was at times employed either to work with other dramatists in the composition of plays, or to improve upon the works of earlier authors, as well as producing plays wholly his own. The works of Webster which have come down to us are few; and though some others have been lost, there is no reason to suppose that he was ever a very voluminous writer.

Among all the Elizabethan dimmatist there is no other who estrongly remineds us of Slukeepeare as Webster, and none, probably, who in a certain department stands so nearly on a level with Slukeepeare. Note that anyone would be justified as easy of their powers: Shakeepeare's genits fa, above all things, many-sided; he is sequally at home in gloom and in smahline, in portraying the anguish of Lear or Othello, or the bright hirlyand of the Aldanumer Shipts Decaw. The music of Webster is all in one key—a key of profound melamcholy is all the one key—a key of profound melamcholy accessed in his own words:

"I do love these ancient runs. We never treat upon them but we as. Our foot upon scene reverend history; And questionists, here in this open court, Which now lies open to the injuries Or storny weather, some man lie metered. Loved the church so wall, and gave so largely to it, True thought it should have employed their longer The thought it should have employed their longer Churches and cities, which have divease, like to men, Must have lift local that his we have.

But in pure tragedy Webster is a consummate master. He can ransack nature and the supernatural world, giving free play to a most active imagination and endless ingenuity, to accumulate images of horror; yet without ever overstenning the line dividing that which fascinates by its horror and sadness from that which disgusts, for with Webster the physical is always subordinate to the moral, the physical suffering a mere accessory to the mental anguish. He has a marvellous power of painting character from the true tragic point of view, character under the tension of passion, minds not only noble in suffering, but ennobled by suffering. And his style is in harmony with the subject which he chooses, always dignified and expressive, full of variety in its imagery, yet always in the same key of sadness.

The greatest of Webster's works are The While Devil or Titleric Coronbons and The Duckess of Mails. The former of these is a very remarkable play, aspecially in the mode in which the character of Vittoria is conceived and worked out. The Duckess of Mails is controlled in the most powerful plays in our language. The outlines of its story are simple. The widowed Duckess of Mails is secretly married to be steward, Autonio, a husband, but for his birth, in every way worthy of her. This troublers, Date Everliand and the Cartinal, two men, whose characters—the coarse pride and passionate crucily of the one, and the cold selfish unning of the other—are admirably contrasted.

They determine to be avenged; they succeed in husband, and seizing and imprisoning the wife. To her they apply every kind of mental torture which ingenuity could devise, and ultimately strangle her and her younger obildren in prison. Of this part of the play Charles Lamb well wrote:- "All the several parts of the dreadful apparatus with which the duchess's death is ushered in are not more remote from the conceptions of ordinary vengeance than the strange character of suffering which they seem to bring upon their viotim is beyond the imagination of ordinary poets. As they are not the inflictions of this life, so her language seems not of this world. She has lived among horrors till she has become 'native and endowed unto that element.' She speaks the dialect of despair; her tongue has a smatch of Tartarus and of the souls in bale, What are Luke's iron crown, the brazen bull of -Perillus, Procrustes' bed, to the waxen images which counterfeit death, to the wild masquo of madmen, the tomb-maker, the bellman, the living person's dirge, the mortification by degrees! To move a horror skilfully, to touch a soul to the quick, to lay upon fear as much as it can bear, to wean and weary a life till it is ready to drop, and then step in with mortal instruments to take its last forfeit-this only a Webster can do. Writers of an inferior genius may 'noon horror's head horrors accumulate,' but they cannot do this. They mistake quantity for quality, they 'terrify babes with painted devils,' but they know not how a soul is capable of being moved; their terrors want dignity: their affrightments are without decorum." And the Nemesis which overtakes the guilty brothers is hardly less powerfully drawn than the sufferings of their victim. One brother, under the terrors of a guilty conscience, is smitten · with that form of madness once so universally believed in-lycanthropy:-

"In those that are possessed with 't, there p'erflows -Such melancholy humour, they imagine Themselves to be transformed into weives; Steal forth to churchynrds in the dead of night, And dig dead bedies up."

Both brothers ultimately fall by the hand of the man who had been the instrument of their crimes; while he, in turn, after aggravating the remorse which tormented him by accidentally killing Antonio, falls by the hand of the madman.

Our space does not allow us to illustrate this play by many quotations, and, of course, extracts would at best convey but little idea of its effect. Webster seems to have concentrated his power especially upon the character of the duchess, and her language is naturally the most characteristic

of the anthor. What can be more pathetic than separating the husband and wife, banishing the - her protest against her brothers' tyrannical hostility to her marriage !--.

"The birds that live in the field. On the wild benefit of nature, live Happier than we: for they may choose their mates, And carol their sweet pleasures to the spring."

In her height of misery she exclaims-" "Oh, that it were possible we might

But hold some two days' conference with the dead I Prom them I should know somewhat, I am sure, I never shall know here. I'll tell thee a miracle : I am not mad yet to my cause of sorrow. The heaven o'er my head seems made of molten brass, The earth of flaming sulphur; yet I am not mad. I am acquainted with sod misery, As the tained galley-slave is with his car : Necessity makes me suffer constantly;

And custom makes it easy."

THE MINOR DRAMATISTS.

The drama of the Elizabethan ago would be very insufficiently estimated if it were judged only by the greatness of its greatest men; it was no less conspiouous for the number of names of striking. though inferior merit. It would be impossible in such lessons as these to give any full account of the dramatists of this class; but there are some whose names, at least, ought not to be passed by. Middleton was a very prolific writer, and his comedies especially are of great merit. The serious dramas of Marston are manly and vigorous. Decker must have been one of the most active writers of his day; but he wrote chiefly in conjunction with others, and there is hardly one of the better known Elizabethan dramatists with whom he was not at some time a condjutor. Chapman, whom we have already mentioned as a poot and the translator of Homer, was in his own day not less popular as a dramatist. Tourneur, the least, and Heywood, almost the most, voluminous writer of the day, would have acquired higher fame in any age but, that in which they lived.

The following is a brief specimen of Heywood's writing, selected from a prologue to one of his numerous plays. What he says of the sources from which he derived the plots of his plays, and the characters that figure in them, may be said of all the dramatists of the Elizabethan period :--

[&]quot; To give content to this most enrious age, The gods themselves we've brought down to the stage And figured them in planets; made even hell Deliver up the fules, by no spell Saving the Muse's rapture—further we Have trafficked by their help; no history

We have left unrifled; our pens have been dinned As well in opening each hid manuscript As tracks more vulgar, whether read or sung

In our domestic or more foreign tongue . Of fairies, cives, nymplus of the sea and laud `

The lawns, the groves, no number can be seamed Which we have not given feet to."

The last of the great race of dimmatists was Shirley, who was born at the close of the reign of Elizabeth. lived through the whole period of the ciril contests and the Commonwalth, and survived by some years the Restoration. We possess no less than forty of his plays; they are in no respect cuitted to rank with the works of the great masters among whom Shirley's youth was passed.

THE CIVIL WAR AND THE COMMONWEALTH:

The period upon which we are now entering presents in the character of its literature the strongest contrast to that which preceded it. In the Elizabethan age we saw the nation for the first time fully roused from the long torpor of the dark ages, and brought under the influence of that great intellectual revival which throughout all Europe accompanied the restoration of learning. We saw the nation, in the new-found strength of its early manhood, seeking a vent for its energies in war, in travel, in discovery, and above all in literature. In its literature we find an eager pursuit of knowledge for its own sake; a keen search for every form of artistic beauty and intellectual pleasure. A period of great prosperity and unexampled national clorleft the genius of the age free to pursue its own ends in its own ways. Controversies there were. no doubt, and of no small importance, but they had not yet made their way into the hearts of the people, or pressed the literary powers of the nation into service on either side; and consequently the leading characteristics, of the literature of the period are, besides its power and extent, above all things, freedom and variety. In the period to which we now come everything is changed. A conflict, such as England had never seen since the miserable days, of the Wars of the Roses, divided. and exhausted the nation. Men opposed one another, not from mere prejudice in favour of this or that candidate for power; their differences lay deeper. In religion they began with the very bases of belief, included the whole of their creed and forms of worship, and extended to the minutest details of practice. Nor were men less profoundly divided upon all that relates to the political and social constitution. And these contests were so engrossing as to absorb, or at least direct, the whole intellectual energy of the nation. ' The most striking qualities in the literature of the Civil War and the Commonwealth are earnestness and concentration, and an Intensely religious spirit. Shakespeare is, in literature, the leading spirit of the one age, Milton of the other. - .

One special circumstance affecting the character of this literator, and strengthening the contrast between it and the preceding sec, ength not to be overlooked. The great glory of the Elizabethan period was its drama. The dominance of the Puritains was the death of the drama; the famatics of that party closed the theatres and proscribed the dramata profession.

It follows naturally from the character of the times that the prose literature bears a far higher proportion, both in extent and in importance, to its poetry than in any former age.

The controversy between Protestantism and the Chunch of Rome, a controversy which in the preceding generation had been carried on with very different weapons, now largely occupied the deepest thinkers and most learned men of the age; and scarcely less absorbing was the contest between the three chief schools within the ranks of Protesters, and Endgement of the Computer of the protection, and Endgements, even Milton binned having, as we shall see becenter, thrown all his energies into this latter controversy.

John Hales was born towards the close of the regin of Elizabeth, in the your 1584, and live the regin of Elizabeth, in the your 1584, and live in was a divine of vast leauning and great powers as a reasoner, and his style is admirable. As a contraversalish, the took the Episeopalian side, as against the strongly Purlum parties, und, like all other men of that day who expressed their own opinion boildy and openly, he saffered much for his honesty when his opponents were in power. He was also a determined antagonist of the claffins of the Church of Rose.

Scarcely less famous than Hales in his own day, and even more so with posterity, was his contemporary, William Chillingworth (b. 1002, d. 154). Chillingworth, while a young man, was converted to the Roman Catholic religion, but he subsequently returned to his original faith, and became one of its most powerful champions against the Roman system. His great work is an elaborate defence of the Protestants a Safe Way to Safe Way to Safe Wat to Safe Way to Safe Way to Safe Wat to Safe Way to Safe Wat to Safe Way to Safe Way to Safe Wat to Safe Way to Safe W

But by far the most Important to the student of this period is Jenemy Taylor. Taylor was born at Cunnelige, in 1613, of very humble parentage If received his education first at a grammar school in that town, and afterwards at Cunia College in the nat town, and afterwards at Cunia College in the nat town, and afterwards at Cunia College in the nat the university, followed, it is sand, by an achievant production to Archibelhop Laud, led to his advancement in the Church and his connection with the Court party. Throughout the Cvili Var with the Court party. Throughout the Cvili Var

he attached himself to the party of the King, and, as chaplain to the army, followed the fortunes of his royal master in the field. After the final trimph of the Parliament over the King, Taylor lived for the most part in retirement; but, as he cominand to write freely in opposition to the cominant party, he sometimes suffered for his opinions at their hands. After the Restoration, Taylor's fadelity to the rayal cause was rewarded by his dippoliturent to the bishoptor of Down and Commor. He died in Ireland soon afterwards, in 1007.

Among all the great men whom the Church of England has produced, there is none to whom the members of that Church are accustomed to look up with more affectionate admiration and pride than Jeremy Taylor. It is not alone his genius, but still . more the purity and beauty of his character and the devotion of his life, which have secured for him this regard. And his works hold almost if not quite, the first place among the standard classics of his Church. He was a very voluminous writer, and his works are of various classes. His devotional works are those which are in the present day the best known, and upon which his fame mainly rests. Tho chief among them are "The Rule and Exercise of Holy Living"; "The Rule and Exercise of Holy Dying"; and "The Life of Christ, the great Exemplar." His numerous sermons, though less generally read in the present day than the works we have mentioned, are fully equal to them in beauty and power. Of his works of an argumentative character, the most noteworthy are his " Apology for Fixed and Set Forms of Worship," a work whose purpose sufficiently appears from its title; and his "Liberty of Prophesying," an argument in favour of religious tolcration. The student of literature who desires to form some idea of Jeremy Taylor's powers cannot do better than select the last-named book for study. In judging of the real liberality of Taylor's principles, it must be remembered, however, that when he wrote this book he was on the beaten side, and the weaker party is always and necessarily in favour of toleration. On the other hand, when we see the narrow limits within which Taylor would confine toleration. we must bear in mind the age in which he wrote, and that in limiting toleration as he does, he did only what the most advanced thinkers of his age did. Milton asserts these restrictions upon teleration more strongly than Taylor does. Taylor was exceptional in the clear doctrines of toleration which he laid down, not in the qualifications which he

placed upon them.

The peculiar ment of Jeremy Taylor's writings is
the marvellous beauty of his style. In this, he
stands, probably, foremost in the golden age of

. ..

English prose. It is true that he is not always free from pedantry; and one cannot fied in Taylor single passages of such surpassing splendour as may be met with in Milton's prose works. Taylor's great power lies in the equal flow of his cloquence, never deformed by harshness or crabbedness, always musical, and always dignified, unfailing in wealth of illustration and in variety of structure. For this very reason, because his charm lies not so much in the peculiar beauty of isolated passages as in the sustained eloquence of the whole, few great writers suffer more in quotation than Taylor. But a few bassages may give some idea of his style. We select them from the "Liberty of Prophesying." Speaking of the strength of early habits and education, and the consequent tenderness with which oarly-learned errors ought to be treated, he writes :-

"Education is so great and so invlucible a prejudice that he who masters the inconvenience of it is more to be or mended than he can be justly blaned that compiles with it For men do not always call them principles which are the prime fountains of reason, from whence such consequents maturally flow as are to guide the actions and discourses of men; but they are principles which thus are first taught, which they sucked in next to their milk, and by a proportion to those first principles they usually take their estimate of propositions. For whatsoever is taught to them at first they believe infinitely. for they know nothing to the continuy. They have had no other masters whose theorems might abote the strength of their first persuasions; and it is a great advantage in those cases to get possession; and before their first principles can be . dissolved, they are made habitual and complexional. It is in their nature then to believe them; and this is helped forward very much by the advantage of love and veneration which we have for the first parents of our persundons . . . Now this prejudice works by many principles; but how strongly they do possess the understanding le visible in that great instance of the affection and perfect persuasion the weaker sort of people have to that which they call the religion of their forefathers. You may as well charm a fever a deep with the noise of bells, as make any pretence of reason against that religion which old men have entailed upon their heirs male so many generations till they can prescribe. And the apostles faund this to be most true in the extremest difficulty they met with; to contest against the rites of Moses, and the long superstition of the Gentiles, which they therefore thought fit to be retained because they had done so formerly, pergenter non quo ennilun est sed one thir; and all the blessings of this life which God gave them they had in conjunction with their religion, and therefore they believed it was for their religion. And this persuasion was fast bound in them with ribe of iron. The apostles were forced to unloose the whole conjuncture of parts and principles in their understandings, before they could make them malleable and receptive of any impresses. But the observation and experience of all wise men can justify this truth. All that I shall say to the present purpose is this, that consideration is to be had to the weakness of persons when they are prevailed upon by so innocent a prejudice; and when there eannot be arguments strong enough to overmaster an habitual persuasion bred with a num, nonrished up with him, that always cat at his table, and lie in his bosom, he is not easily to be called heretie; for if he keeps the foundation of faith, other articles are not so clearly demonstrated on either side but that a man may innoceatly be abused to the contrary;

and therefore, in this case, to handle him charibbly is not to do him justice. And when an animon in suprorious released entertained upon the ditle and stock of education, it may be the better permitted to him, alone upon the better stock nor stronger arguments most men cast tain their whole religion—even Christianity their.

Very characteristic of the writer is the beautiful

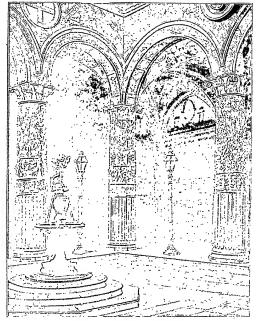
"I ent with a story which i find in the Jow book. When Almahan sich is the trust duer, secondary to this entous, waiting Almahan sich is the trust duer, secondary to the entous, waiting Jossing on his start, weary with age after tweet, combige forcests between the start of the start of the start of the start of the Joseph of the Start of the Start of the Start of the Start of the Joseph of the Start of the Start of the Start of the Start of the Joseph of the Start of the Start of the Start of the Start Joseph of the Start of the Joseph of the Start of the other of the Start of the St

- ARCHITEOTURE. — XI.

THE ITALIAN, OR RENAISSANCE, STYLE. BEFORE proceeding to describe the buildings of the Italian Renaissance, it is necessary to point out that between the old traditional styles in each country and the introduction of the puro Italian there existed, as with other styles, a transitional period a period during which the ornament and leading features of the new style wore employed in a decora tive sense and in the spirit of the old traditional work. This period is known in Italy as the Cinqu Cento style ; in France as the style of Francis I.; in Spain as the Platercsque, or silversmith's, style; and in England as the Elizabethan and Jacobean. latest revival which has taken place in this country, and to which we shall refer again, is based on this transitional period, and many of its models are to be found in Belgium and Holland, two countries, curiously enough, in which the pure Italian style never seems to have taken a footing.

The Cinque-Canto style in Rome is found only in tombs by Sansövino and other sculptors who were auxilling to bind their funcies by the rules laid down by Vitruvius. In the north of Italy it is found in she ocut of the Palazzo Vecchio at Florence (Fig. 40), is the areades of Bologna, in the town-hall and church of Santa Maria-dei-Miracoli at Rescia, in the Certosa. at Pavia, in the dome and apses of Santa Maria-delle-Grazie at Milan, in the ducal palace at Urbino, and in other towns; the greatest variety, however, being found in Vonice, which, probably owing to the much greater perfection of the Gothic style in her palaces, seems to have clung to the traditional feeling which still lingered there. Thus, we have in the church of the Miracoli, in St. Zaccharia and St. Giebbe, in the later portions of the Ducal Palace, in the schools of San Rocco and San Marco, and in the Vendramini Calerghi and Corner-Spinelli Palacos, a large series of Cinque-Couto buildings of the greatest beauty buildings in which the design is based on Gothio principles, whilst the ornament and details are adapted from classic examples, treated, however, with perfect freedom, and with a delicacy and beauty in the carving which has never since been approached, except, porhaps, in some of the early French buildings of the first half of the sixteenth century.

Although, as will be seen later on when dealing with the Italian style in France and England, domestic or secular prohitecture supersedes the desinationl' buildings of past styles, in Italy the chief revival of classic architecture was developed in her churches, and of these there were two types: (1) the basilican church, with paye and sisles separnted from one another by columns carrying arches, and covered with an open timber-roof or with flatpanolied ceiling; and (2) a church with barrel-vault over the nave, which was separated from the aisles by massive piers with arched openings between, the aisles also being vaulted. Since the early basilican days, the transept, originally at the east end, had been brought forward and given up to the laity or the congregation, and the space behind it, called the choir, had been appropriated by the priests; already in the beginning of the fourteenth century, at Florence, in the church of Santa Mariadoi-Flori, the architect had conceived the idea. of giving more importance to the centre of the church by the erection of a dome, of which so magnificent an example existed in the Panthoon at Rome; and the first, feature of the new Italian style was the great dome which Brunelleschi erected on the structure commenced by Arnoldo di Lapo at Florence, and for the design and construction of which he made a special study of the earlier Roman example (Fig. 41). The diameter of the Florence don is only one foot less than that of the Pantheon. height of its springing is far greater, being 180 feet from the ground, and the height to summit of vault is 280 feet. It was, therefore, n work of extraordinary magnitude, and, as might have been ex-pected, served as a model for that which the Italian architects may almost claim to have invented, viz.,



Total Community of the Paragor Vicence, Property

the crection of a dome on the intersection or crossing of the nave and transept of a church. 'The two other churches which Brunclleschi designed at Florence were those of St. Lorenzo (which he completed) and of St. Spirito, both of the basilican type, ple of the barrel

vanited church, we may mention the church of St. Andrea at Mantus, by Alberti; this is crowned by n small dome at the crossing. The ebief interest of the ecclesiastical revival of classicarchitecture centres in the entlyedml of St. Peter's nt Rome, one of the most stupendoue structures in existence, being 650 feet long and covering enuare feet-more than double the area of Milan Cathedral, four times the area of Salisbury Cathodral, and nearly three times the area of St. Panl's Cathedral, London. (Figs. 42, 48.) It occupies the sito of the original St. Peter's, erected by Constantine, the tribune or apse of

that church lying under the central dome of the new building. The foundations of a portion of the building in the west apso (the church is orientated after the early custom, the entrance porch at the east and and the apse at the west end) were laid by Nicholas V., about 1440; but little was done for half a century, when Pope Julius 11. commissioned Bramante to prepare designs for the structure, the foundations of which were had in 1506. Bramanto died in 1514, and other architects (Raphael, Peruzzi, and San Gallo) were successively appointed to succoed him. In 1546 the building was placed in the hands of Michael Angelo, who constructed the dome, and probably a great portion of the exterior, on the

same lines as Bramante's plan, except that the Greek instead of the Latin cross was adhered to-that is to saf, the nave, the choir, and the north and south transcepts were each of the same length. In the beginning of the seventeently

century the nave was increased in length by three bays, and a narthex or entrance vestibulo was built by Maderno; and lo 1661 Bernini added the pinzza, with its semicircular porticos and its fonntains. The lengtheniug of the nave has been fatal to its external effect so far as the dome is concorned, which is nlmost entirely hidden from the pinzza; in fact, the rear elevation ls the only side from which its form can be properly seen. The nave, cheir, and transept are all covered with barrel-vaults. The domo is 138 feet in diameter, its height. to the sumuit of the vault 330 feet. The size of the intorior is diminished in effect by the enormions height of the Corinthian pil-



nators, which are 105 feet in height; and although the richest marbles and sculptures are employed in its decoration, the general aspect is not of a rell-Of other churches we may mention gious nature. the church of St. Maggiore, of the Salute at Venice, and of the Annunziata at Genea

With the exception of a dome at the intersection of nave and transept, the Italian architects introduced no fresh arrangement in their churches, and all their ingenuity seems to have been turned in the direction of finding a new costume wherewith to dress the old by figure.

Secular architecture fored before in the hands

of Italian architects than occlesiastical work. New

combinations were required, vestibules and courtyards, stately staircases, and suites of rooms for receptions, on a far grander scale than had hithertobeen conceived; and it is in these that we find the at Florence, attributed to Raphael, and the Farnese Palace at Rome are typical examples of the latter. The Cancellaria and the Belvidere Gallery of the Vatican, both in Rome and designed by Bramante,



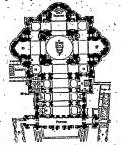
Fig. 43.-Sr. Perra's, Rose.

most interesting examples of the development of the new style.

The earliest palaces of this style were those of the Riccardi (1430), the Pitti (1435-50), and the Strozzi (1439), all in Florenco; and the Piccolomini and Spanochi Palaces in Siena, These, so far as their exterior is concerned, are chiefly based on the early example of the Palazzo Vecchio, in which rustleated masonry is employed; the classic features appearing in the widely projecting cornices which crown them and in the interior courtyards. In the sixteenth century the decoration of the exterior is of two kinds: the several storeys have their wall-surfaces divided by pilasters of the orders superimposed one over the other, or the decoration is confined to rusticated masonry at the angles, and to the window designs, which are flanked with architraves or with pilasters, and crowned by angle or curved pediments. The Pandolfini Palace added the Farnesina, the Massimi, the Ossola Palaces by Peruzzi, the villa of Pope Julius, and the palace of the Caprarola by Vignola, and the Tiene and Barbarino Palaces, and the great hall at Vicenza by Palladio. In all of these there is the same arrangement of superposition of pilasters of the several orders, one above the other, with a cornico crowned by an attie or balustrade and a flat roof. Michael Angelo introduced a new phase, carrying one great order through the storeys, which, while it gives a certain palatial aspect to the block, is opposed to common sense. An example of this is found in the Museum of the Capitol at Rome. Other variations are found in Genoa, where the marble vestibules and staircases are features of great beauty, the marble apparently being confined to these, as the fronts are invariably in stucco. It is to Venice again, therefore, that we turn for the finest examples of

are good examples of the latter. To these may be

this style and in the Cornaro Palace by Sansovino (who also erected the loggia at the base of the great campanile opposite St. Mark's), the Grimani Palace by San Michele (1548), the Balbi Palace by Vittore, and the Rezzonico and Pesaro Palaces (both dating from the middle of the seventeenth century and designed by Longhena) we have magnificent specimens of Italian Renaissance.



a, Chapel of St. Sebastian ; z, Chapel of the Holy S

· COMMERCIAL · CORRESPOND-· ENCE .- VIII.

[Continued from p. 13.]

FRENCH, GERMAN, AND ENGLISH. 44.—LETTER ON FAILURE OF A FIRM. London, January 1st, 18-.

Messrs. Carlton & Co., Manchester. Gentlemen,-Our last, which we beg to confirm,

was dated the 15th ultimo. You will, no doubt, have been already apprised

by telegraph of the failure of the old-established firm of Bernard and Co., which took place to-day. . . Although the position of this house has for some time been considered precarious, in consequence of

the difficulties in which the ----- Branch has been involved since the ontbreak of the war with ----

where they did their chief business, it was hoped that with the assistance of some friends, and the arrangements proposed by the creditors, the present crisis might have been avoided.

Unfortunately, Messrs. Bernard and Co. received last night the sad news that the --- bankers refused to make any further advances on bills drawn on . ---- ; which circumstance prevented the ---- Branch raising the funds which they had to remit to the London house for the payment of ! their drafts. In consequence, the latter were com-

pelled to suspend payment. There is nothing known yet with regard to the exact position of the house; some expect a dividend of 10s, in the pound; others say there will not be more than 5s. or 5s. 6d. at the utmost.

As the assets chiefly consist of debts in which in the present state of affairs are not easily collected, we think it rather difficult to make a correct estimate of what the dividend will be, but it will probably be between 5s, and 12s, 6d, in the pound,

Unfortunately, we are interested in this failure for some thousands, which very likely will also be the case with you, but, we hope, not to the same extent, As soon as we are in possession of further parti-

culars about this sad affair, we shall transmit them to you. Meanwhile, We remain, Gentlemen, yours truly,

A. Dobson & Co.

Londres, to Ier janvier, 18-

Messieurs Carlton & Cle. à Manchester. Messieurs,-Notre dernière lettre, que nous vous confirmons, était du 15 du mois dernier.

Vous avez sans doute déjà appris par télégraphe la-faillite, qui a en lieu aujourd'hui, de la vieille maison Bernard et Co.

Quoiqu'on considérât la position de la dite maison comme précaire, déjà depuis quelque temps, par suite des difficultés où la Succursale de se trouvait depriis le commencement de la guerre avec ---- avec qui elle faisait ses principales affaires, on espérait pouvoir éviter cette crise par l'assistance de quelques amis et les arrangements que les créanciers avaient proposés.

Malheureusement, Messieurs Bernard et Cio ont recu hier soir la triste nouvelle que leurs banquiers de ---- avaient refusé de faire de nouvelles avances sur des traites tirées sur ----, ce qui a empêché leur Succursale ---- de se procurer les fonds qu'elle avait à remettre à la maison de Londres pour le paiement de ses traites. Par suite de cette circonstance cette dernière s'est vue dans la nécessité de saspendre ses paiements.

On ne sait encore rien sur la position exacte de la maison; les uns s'attendent à un dividende de 10s. par livre, d'autres disent qu'il n'y aura que 5s, ou 5s. 6d. tout au plus.

· Commo les crédits faits en ---- composent principalement l'actif, et qu'en l'état actual des affaires la rentrée sera très-diffieile, nous ne croyons pas que l'on puisse dire à peu près quel sera le dividende, mais on espère que ce sera de 5s. à 12s, 6d. la livro

Nous sommes malheureusement intéressés dans cette faillito pour quelques mille livres; très-probablement que vous êtes dans le même cas, du moins

nons l'espérons pour un montant moins fort, Aussitôt que nous aurous plus de détails sur cette triste affaire, nous vous en ferons part. En áttendant,

Nous your présentons, Messieurs. Nos cordiales salutations.

A. DOBSON & CU.

Benten, 1. Januar, 18 -..

Berren Catton & Co , Mauchefter. Bir beftätigen unfer Cigebenes vom 15, ufte.

Gie merten obne 3meifet bereite burch ben Telegraphen von bem bente eingetretenen Salliffement ber alten Berna Bernarb und Co. informirt fem. Dogleich bie Lage biefes Saufes feit einiger Beit für zweifethaft.

gehalten mutte, in gulge ber Comigrigleiten in welche bie - Juliale burch ben Ansbruch bes Rrieges in rerwidelt mar-mefelbft fie ibr Saurtgeichaft machte-fo beffte man bie genempartige Grife mit ber Gutfe von einigen Freunden um ben von ben Grebiteren vergeichlagenen Mugnacmente vermeiren gu tounen.

Ungludfregerwerfe empfingen bie Berren Bernarb & Co. geftern Mbent tie traurige Dladendit baff tie - Bant. baufer weitere Berichiffe gegen auf - gewarne Tratten permeigerten, welcher Umffant tie - Biligfe verbinterte. tle Gefter anfgutreifen, teren fie gun Bemittiren an rie Contoner Suma in Bablung ihrer Tratten bernrfte, Lettere

mar in Solge teffen genothigt, ibre Sablungen einenftellen. Uber rie getnelle Lage res Saufes ift nech nichts Befitiers befannt : eimge erwarten eine Diritente von 10s. per Binne · Sterling, antere behautten es wurte bochftene De, eter 5s. Gd. beraustemmen.

Da tie, Activen bauptfachlich aus - Schuften befteben, welche bei ber jegigen Situation nicht feicht einzuziehen fint, fo balten wer ce für gemlich fichwer eine correcte Schabung ber gu erwartenten Divitente gu machen, bech wirb riefelbe mabricheinlich greichen 5s. und 12s. Gd. rer Bfund Sterling betragen.

Ungludlicherweife find wir in biefem Salfiment mit einigen Taufenten integeffitt, mas bei Ibnen wohl auch ter fall fein rurfte, wenn auch hoffentlich nicht bis zu tem gleichen Befang. Cobaft wir mi Beffne meiterer Detaile fiber tiefe traurige Cache fint, werben wir Ihnen tiefelben übermitteln. Bit babin verbleiben wir.

Sechachtungevill.

M. Dobfen & Co.

45.- LETTER WITH ACCOUNT CURRENT. . Paris, January, 1899.

Messrs. Walker & Marshall, Leeds.-Gentlemen,-As we are closing our books for the past year, we beg to hand you an extract of your account current, showing a balance in your favour of £2.822 5s. 6d. to the 31st December, 1890, which we carry forward.

A. LELEUX & Co.

Believe us, Gentlemen, yours truly, Paris, janvier, 1899, Messieurs Walker & Marshall, à Leeds.

Messieurs.—Ocennés du règlement de nos livres pour l'année qui vient de s'éconler, nous avons l'avantage de vous remettre le relevé de votre compte conrant, présentant un solde en votre faveur de £2,822 5s. 6d. au 31 décembre, 1890, que nous reportons à nouveau.

Recevez, Messicurs, nos salutations cordiales,

A. LELEUX & C. ..

. Baris, Januar, 1809. Beiren Baller & Matfchall, Berte.

Dit tem Abichluf . nuferer Bucher fur the vergangene Sabr beferaftigt, bebandigen wir Ihnen hiermit einen Anbung Ihres Conto Cerrente mit einem Gates an Ihren Gunften won £2822 : 5 : 6'per 31, December, 1890, welchen wir vertragen.

Sechachtungerell, M. Belenr & Co.

46.—REPLY TO PRECEDING LETTER. Leeds, February, 1890.

Messrs. Leleux & Co., Paris. Gentlemen,-Your favour of . . . ult. is duly to hand, covering extract of our account current with

you, which we find correct. We have carried forward the balance in our favour of £2,822 5s. 6d. to the 31st December, 1890. in conformity.

We are, Gentlemen, yours faithfully, WALKER & MARSHALL.

Leeds, février, 1899. Messicurs Leleux & C∞, à Paris. Messieurs.-Votre honorée du . . . nous est bien

parvenue, convrant le relevé de notre compte courant chez yous, que nous avons trouvé correct. Le solde en notre faveur de £2,823 5s. 6d. a été

porté à compte nouveau, valeur au 31 décembre, Nons your saluons, Messicurs, avec empressement,

WALKER & MARSHALL.

Beets, Bebrnar 1899 .. 36r Berbries vom . . ift in unferm Befit unt haben wir ben nne bamil überfantten Rechnungeausung richtig befinten.

Bir baben ten Salto von £2,822 5s. 6d. ver 31. December, 1890, gleichlautene mit Ihnen vorgenzigen. Sochachtungerell,

Balter & Marshall.

47.—REPLY TO LETTER ASKING INFORMATION

ABOUT A SWINDLER.

Liège, November 10th, 18—...

Messrs. Bianchi & Co., Geneva.

Gentlemen,-We beg to acknowledge the receipt of yours of the 2nd; for which we thank you. The Peter Orlandi whom you mention we have known for about the last three years. We always executed a small order of his for his Italian journey, and expected to be paid before executing the next, as we lad none but extremely uncertain information concerning him. At his last journey but onc, he had mentioned to his agent that in a short time he would be able to extend his operations, as, by means of his brother or some other person, he would have some £20,000 more capital, and that all his purchases would then be for ready money. Some time before his arrival, he wrote to say that the imminent outbreak of hostilities had brought him a number of orders, and that he would be at Liege in a few days with ample funds; he ordered his agent to call upon several manufacturers to request them to have ready for him a large assortment, as he was enabled to pay for his last orders as well as the new purchases.

Following these instructions, the agent called. not only on the firms who knew him, but also on some where he had not been before. Finding out sellers, he took the wretched swindler, after his arrival, to the various firms, who, thinking they would be paid beforehand, pushed the sale. When the time for his departure arrived, he gave acceptances in proper order on well-known firms, to most of the vendors, who accepted them, intending to send them off at once to ascertain their real value. To the firms who knew him he said that, having bought more than he had intended, he should pay them immediately on his arrival at Genoa. The boxes containing his purchases were delivered and sent off, as people were far from suspecting that they were dealing with an experienced swindler. A few days after, the sad truth was learnt. Our town loses about 900,000 francs. We ourselves, like others, lured by the prospect of an immediate payment, lose about 27,000 francs.

Herewith we send you an acceptance which he has given us, and which is of no more value than the others; we also give you our authority to proceed against the swindler, should he still be in your city, and remain, very truly yours,

DE PRETIS BROTHERS.

Liège. le 10 va embre, 18-.

Messieurs Bianchi et Co, à Genève. Messieurs,-Nous avons reen votre honorée du 2 courant, et vous en sommes reconnais-unts. Le sieur Pierre Orlandi dont vous nous parlez nous est counu depuis environ trois ans. A chacun de ses voyages en Italie, nous lui avons toujours exécuté nne petite commande, nous attendant d'en être soldé avant de donner suite à aucune autre, vu oue nous n'avions eu que des renseignements très-incertains sur sou compte. A son avant-dernier voyage, il avait confié à son représentant ou'il serait bientôt en mesure de pouvoir opérer plus largement, parce que par l'eutremise de son fière ou d'ane autre personne, il aurait un capital de £20,000 de plus ajouté à son commerce, et qu'alors tous ses acliats se feraient au comptant. Quelque temps avant son arrivée, il écrivit que la guerre imminente lui avait amené de nombreuses commandes, qu'en conséquence il serait à Liège dans quelques jours avec un portefeuille bien garni ; il ordonna à son représentant de voir plusieurs maisons et de les prier de lui préparer un grand assortiment, car il était à même de solder ses derniers achats et ses nouvenus.

Muni de ces avis, le représentant visita non-seulement les maisons qui le connaissaient, mais encore celles où il n'était pas encore allé. Il trouva des l'abricants : à l'arrivée du misérable escroc, il le couduisit dans les différentes maisons, qui peusant être payées au comptant, poussèrent à la vente. Au momeut de partir, il donna des effets acceptés et parfaitement ou règle sur des maisons connucs, à la plupart des vendeurs, qui les recureut, mais avec l'intention de les envoyer do suite pour en connaîtreleur valeur réelle. Aux maisons qui le connaissaicut, il leur dit qu'avant acheté plus qu'il ne pensait, il leur ferait le versement de ses achats à son arrivée à Gênes. Les caisses contenant ses marchandises furent livrées et expédiées, car on était loin de soupconner que l'on eût à faire à un habile chevalier d'industrie. Quelques jours après, ou apprit la triste vérité. Notre place se trouve dans cette malheureuse affaire' pour environ 900,000 francs. Quant à nons, trompés comme les autres par la perspective d'un paicment au comptant, nous perdons environ 27,000 francs.

Sons ee pli nons vous remettons une valeur qu'il nons a donnée, et qui ne vaut pas mieux que les autres; nous vous envoyons anssi nos pouvoirs pour poursuivie cet escroc s'il se trouve encore dans votre ville.

Nous vous présentons, Messieurs, nos sulutations cordiales,

DE PRETIS FRÊRES.

guttid, 10. November, 18-.-. Serren Bland) & Co., Genug,

Bir empfingen bantenb 3hr Geehrtet vom 2 ener. Den ron Ibnen ermabnten Beter Orlanti baben wir feit errea trei Jabren nelaunt. Wir pflesten eine Heufe Orter für feine italienifche Reife nutzuführen, und macteten teren Begabtung vor Musführung eines neuen Muftrages ab, ben wir nur febr unfichere Informationen über Genannten erlietten. Bei feiner verlepten Deife batte er feinem Agenten gegenüber ermabut, er marte feine Orerationen in Rurgem andrebnen tonnen, ba fich fein Empital mit Gulfe feines Bentere oter eines Anteren mm etwa £20,000 vergrößern murte, monach er alle feine Gintaufe genen Caffa zu machen begefichtigte. Rurg ver feiner Anfunft febrieb er, taf ter mmittelbar becerftebente Unsbeneb ren Beintfelfaleiten ibm eine Inzahl von Auftragen verfchafft babe, unt taf er in einigen Tagen mit gemigenten Geltern in Butich eintreffen merte. Er teng feinem Maemen nut, verfdietenr Tabrifanten zu befinden unt fie me Anfmadung eines großen Miertimente aufenforcern, ba er fowrbf fur feine tenten Auftraar nis auch fur feine nenen Cintaufe en bezahlen im Stante fein Iverte

Diefen Inftruetionen ju Tolge bejudte ber Agent nicht nur tie Banfte tie ibn launten, fontern anch einige bei benen er nech nicht vergefreeden fatte. Dadtem er Beilaufer gefinnen. führte er ten Schrintfer unch feiner Anfunft gu ten verfchetenen Birmen, treiche in Gewartung vorberquerfeigenter Bablung ten Berlauf rouffirten. Ber feiner Abreife begabite er bie Debryabl feiner Berfaufer vermittelft Mererten von wohlbefannten Sirmen. Gritere nabmen tiefelben an, in ter Militet, fie fofort zu begeben. um ihren reellen 2Beeth feftinftellen. Den mit ibm fruber belannten Fermen verfrend er Bablung nach femer Antunft in Genna, unter tem Borgefen, bag er niefr ale beabsichtigt, gelauft fabe. Die Riften mit ten BBaren murten ausgeliefert unt afgefantt, ba tie lente nicht nigten, bag fie es mit einen; geriebenen Comuntter an ibnn batten. Ginige Tagen frater lam tie traurige Babrbeit jum Bericbein. finfere Clatt pertiert curca fe. 900,000. Wir fell-ft, aleich anteren, bie fich burch ble Uneficht feferiger Bablung verloden lieben, verheren gegen fe. 27,000.

Bir finten Ihnen einlicent ein von ibm erbaltenes Mecert, welched nicht mehr went in, als die anderen, und wir anterifiren Gie gleichjeitig, gegen ben Schwintler vorzugehen falls er nich in Shere Statt weifen follte.

Sechacitungteell.

Gebrüber De Bretie.

HEAT-I.

THE general idea of heat is that it is a something which gives the sensation of warmth. This is only partly true. A piece of iron when intensely cold, as in Arctic lands, appears to the touch quite hot. The sensation of heat, therefore, does not under all circumstances denote what we shall consider as heat in these lessons, and any definition of it, were we to frame one, would not have to depend wholly upon the sense of touch.

There are certain effects, however, that we ace which are not false impressions—this near incise size. An inquiry as to how this is done would take use a tepf matter in our endeavours to find out the nature of heart. As a preliminary, we ask:—Is this heart which unless ice a bodily something which is humatrical to the ice, or is it simply a motion which has been commissioned to the situation which has been commissioned to the situation parts of the solid water so as to give them the rolling motion of fluidity?

THEORIES OF HEAT,

These questions represent two theories on the subject which have been held by different philosophers. According to the former of these, heat mires from a subtle improducable substance called activities, which surrounds the ultimate atoms of all substances, and is capable of pussing from one body to another. This is known as the onlore theory, and was for a long time almost universally received. According to it, no new heat could be called into the contract of the contract o

substance while was range continue could be represently explained upon this theory, but the probacially explained upon this theory, but the probation of an almost sullmitted amount of heat by frietion could not be accounted, for, since it was obvious that no heat could be evolved in this way obvious that no heat could be evolved in this way that was not previously stored up in the substance. An extensive series of experiments on the question was conducted by Count Lundord, and led to the overlained experiment by Sit 11. Davy fully supported likes elsew.

When fee becomes melted, a large amount of leant disappears on becomes latter, as will be fully explained hereafter; the winter, therefore, according to the earlord hereofor, must possess a much langer amount of embried than the fee. Davy accordingly took two langes of fee and rubbest them violently together, and in a short time found' that a partien of the few sens ingueded by the first-lon. Now, as many the form of the fee was imposed by the first-lon. Now, as many than the first here is a locar that there are not the first here is a locar that there are no short than the first here is the first here. The first here is the first here.

These experiments, with many others which might be quoted, tend strongly to disprove the caloric theory, and to support the other or dynamical theory. According to this, heat is not a material

HEAT 79

substance, but a motion of the utilimate spartlets or which bodies, are composed. In this way heat presents many analogies to light and sound, for it witherations of the same and the same and the replavibration of the particles of any body, or, according to some, the vibrations of an impondemble fluid by support or this view, we find that notion is requestly or this view, we find that notion is frequently converted into heat, and conversely,

that heat may be changed into motion. When a bull is allowed to full from a beight, it is allowed to full from a beight, it is now strike upon some hard substance, and it will immediately, be brought to rest: it is motion will not, inversely to homely a being the motion will not be seen it we have a substance, and it will not be seen it we have a substance of the bull that have been in the substance of the bull has been obtained in the motion of the bull has been obtained in the motion of the bull has been obtained in the substance of the bull has been obtained in the substance of the bull has been obtained in the substance of the bull has been obtained in the substance of the bull has been obtained in the substance of the bull has been obtained in the substance of the bull has been obtained in the substance of the bull has been obtained in the substance of the bull has been obtained in the substance of the bull from the substance of th

AN EFFECT OF HEAT.

Take a glass flask and fit is with a good oork, through which a plece of glass tubing has been passed (Fig. 1). Let the end of this glass tube dilp into water under an inverted tumbler filled with water. Now beat the flask with a flame of some kind—candle or Bunnen-burner—and bubbles of air will begin to issue from the end of the tube-and rise up into the tumbler, where



the expelled air will be collected. We may suppose here that the bent imparted to the air in the flash gives the particles wider movements, that they require more room, which shows itself

TEMPERATURE.

The same phenomenon of expansion is seen in lesser degree in liquids when they are heated. Thus, mercury is seen to expand when it is heated in a glass bulb connected with a long narrow stem, and this constitutes one of the most familiar of instruments—the thermometer. The hotter the mercury is made the higher the silver-like thread rises in the narrow stem, conversely the colder the mercury becomes the lower the thread of metal descends towards the main body of, it. If the thermometer be placed in succession in several different liquids, and they all bring the mercury to the same point in the stem of the thermometer, all these liquids are said to have the same temperature; if the liquids have not the same effect on the mercury. the one which brings the liquid metal to the highest point has the highest temperature, and the one which depresses it to the lowest point has the lowest temperature. We may regard temperature as a variable quality of matter, and its intensity we measure by the thermometer. This measure-ment is effected by means of a scale of degrees usually marked on the stem of the instrument, Thus with the Fahrenheit scale the freezing-point of water is put down as 32° and the boiling-point as 2120; the space between is divided into 180divisions or degrees, and 32 similar divisions below the freezing-point we have the starting-point or zero (0°) of the scale. In the Centigrade instrument the zero or beginning of the scale is the freezingpoint of water, and the boiling-point is put at 100°.
In these lessons we shall denote the respective scales by the letters F. and C. in the usual way. third scale of degrees is sometimes employed named the Rénumur scale, in which the freezingpoint of water is 0°, and the boiling-point 80°.

Let us now for a moment consider guarathy.

Let us now for a moment consider guarathy at the first consider guarathy and the first consider guarathy and the first consideration of the first consideration of the first consideration of the first consideration of the first construction of control given favor for the first construction of the first construction of control giving rise to 500 cunits of heat—La., if we could utilize all the heat produced in burning the first construction of the first construction

In passing we may say that the unit of weight usually employed is the kilogram (24 hb.), and the quantity of heat required to raise one kilogram or water 1°C. In called a calerie. Thus to take the foregoing examples his burning. In the following table we have given the quantities of heat following table we have given the quantities of heat produced by burning a unit quantity of the substance in oxygent:—

S	rbetance burned				020	untitu	of h	cat produce
	Hydrogen	-			-	٠.	•	31,162
	Carbon -	-	-			-	-	8,080
	Sulphur -							2,220
	Iron -							1,576
	Conl -	-	-			-	-	5,000
	Coke -	-	-	-	-			7,000
	Phosphorus		-					5.747

Though the numbers represent the amount of heat actually preduced by combustion, if is but merly that we can obtain and usefanything like this amount, a large portion being always wasted. In the attenmengtine, for Instance, the work necomplisted by any mount of fails is selden more time one-eighth of the theoretical amount, and often failssight on the properties of the properties of the given of with the soulce in the oblimery, and much is lost by being communicated to the machinery and given off by refusition.

In an ordinary fire-place, too, only a small intention of the best generated is serviceable in warming the room, the greater portion ascending the chimney, and being occepted in producing the upward draught. On this ascenari many other control of the control of

SOURCES OF HEAT.

The chief physical source of the heat which we employ is the sun, which, although stanted at such an immonse distance from us, nevertheless warms the earth by its mys. Of the source of the solar heat nothing is known, although many clever hypotheses, as well as many zery foolish ones, have been started. So great is the amount of solar heat received by the earth that it has boon calculated that it would be sufficient to moit in a year a layer of ice surrounding the globo to a thickness of thirty-eight yands. Other sources of heat we may consider under the following heads:—

1. Terratrial.—As we dig down into the substance of the earth, we find that the temperature diminishes a little in summer till we attain a depth of about twenty yards. At this depth it remains constant all the year round, the summer heat and the winter frost being allike unable to penethate; the temperature of this stratum is about 50° F. If now we sink still deoper, the temperature is found to increase at the nate of one degree Fahrenbeit for every sixty or servery feet, and this increase continues nearly sufform, whatever depth we addain, multisticture of the summer of the summer of the manner of the summer of the summ

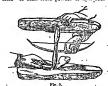
could resist it, and even the lardest rock would be fused. The noditing-point of any body becomes, however, higher as the pressure on it is increased, and thus it is probable that the thickness of the crust of the earth is far greater than this. Many astronomical observations seem likewise to point to the same conclusion.

The air resting on the earth becomes warmed by contact with it, and by its radiation, so that as we ascend above the earth's surface the temperature gradually diminishes at the rate of about one degree Enheralistic severy 300 feet of cleration.

Though we are mainly dependent on these physical sources for maintaining our temperature, there are, mechanical and cleminds sources of heat which are of great importance to us, and to which we must

accordingly direct our attention.

2. Frietland—The first of these sources of heat is frietlen, and the simplest experiment that can be tritted, at libraring the production of least in this critical, at libraring the production of least in this wife, and the same production of the same production



camulates in a groove on the lower piece, and the heat becomes sufficiently intense to set light to this (Fig. 2).

The experiments of Count Funniord on this subject must be described here, as they were acrelly arranged and conducted, and are very frequently-referred to. He was engaged in seperimentally be boring of camon in Maniela, and in the course of this, was strack with the great amount of heat evolved during the process. In order to determine this source of this bent, he constructed a metal to the course of this bent, he constructed a metal.

HEAT. 81

cylinder weighing aboit a hundredweight, which was onused to rotate against a hunt stead borer. After the lagse of half an hour the temperature of the cylinder was found to have increased from 100° to 150° Z, while the particles of metal worn of only weighed SG grains. It was welden the only weighed SG grains. It was welden to heavy cylinder 70° bould not have been velocity to the contract of the cylinder of the contract of th

. In another experiment the cylinder was immersed in a vessel containing about two and a half gallons of water, and made to rotate against the blunt borer as before, and in the course of two hours and a half the water was caused to boil by the heat thus evolved. The supply of heat thus obtainable appeared indeed to be inexhaustible. The power which drove the cylinder was in this case converted into heat, just as when the brake is applied to a train the wheels are seen to smoke and give off sparks, owing to the motion of the train being converted into heat and thereby destroyed. We see now the reason why grease is applied to the axles of wheels and to pieces of machinery; if it be absent the friction is increased, and then a portion of the power is wasted by being converted into heat, instead of being employed to do the work of

In these experiments the quantity of heat produced has been so great as at once to be observed: very often, however, the amount is so small that it cannot be woll shown, even by an ordinary thermometer. The mode, therefore, usually adopted in rendering its presence manifest is to use a thermoelectrip pile.

If a bar of bismuth and one of antimony be joined on to end, and the point of junction heated, a funit current will pass between the ends of the bar and will deflect the needle of a glavmometer. When several such compound bars are employed, much greater sensitiveness is obtained. The bars are born in the middle so that the alternate junctions may bend rous dale of the pile, as seen

may be at one side of the pile, as seen in Fig. 2. The ends are then connected, by the binding screws seen on the top, in Fig. 3, with a deliated galvanometer, and we have thus a means of readering visible the faintest amount of heat. So delicate, in-deed, may this instrument be made that the warmth of the hand, when the did at the distance of several feet,

will visibly deflect the needle of the galvanometer. An instrument of this kind is of great service in all researches on heat; it is, in fact, almost indispensable, and hence frequent reference will be made to it in these lessons.

3. Percussion and Compression.—The next sources of heat which we must refer to are propossion and compression. An illustration of the production of heat by the former has already been given in the

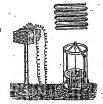


Fig. 8..

experiment of letting fall a leaden bull. A piece of soft iron, too, may be rendered red-hot by a few skilful blows on an anvil; and a blow or two with a hammer on an ordinary nail will at once raise its temperature sufficiently to affect the thermo-electric pile, and offen to ignite a luoifer.

The best means of exhibiting the effects of compression is by the compression syrings represented in Eig. 4. A piece of stoat glass or metal tube closed at one end, and having an internal diameter of about half an inch and a uniform bore, has a piston fitted tightly to xt: in the under side of this piston is a small coarty in which a small fragment of the compression of the six of well or some apport, and the piston quickly forced into it. So much heat is produced by the sudden compression of the air that the tinder is



ignited, and when hastily drawn out will be found red-hot and smouldering.

When a jet of hydrogen gas is allowed to strike upon very finely divided platinum, it sometimes renders it, red-hot, and thus the gas becomes ignited. This may partly be attributed to condensation of the gas in the pores of the platinum, and partly also to chemical action. (See lessons on Light, Vol. VII., p. 119.)

This property of spongy platinum is sometimes turned to account in Dobereiner's lamp, which is shown in Fig. 5. It consists of two glass vessels, a and B, the neek of



Fig. 5.

bottom of B. A piece of zinc (z) is placed in the lower one, and diluted - sulphuric acid is poured over it; the upper one is then fixed tightly in its place, the neck being ground so that it may fit air-tight. The action of the acid on the zinc gives off hydrogen, which drives the liquid into the upper vessel, and thus leaves the zino dry. As soon as the

A reaching to the

tarned, the gas escapes, and coming into contact with the spongy platinum contained in D, is ignited. The acid then passes again into B, and a fresh sniply of gas is generated.

4. Cheminal.—The next and perhaps the most important source of best is chemical eacton. Nearly all obsertions of best is chemical eacton. Nearly all obsertions of production of a greater or less degree of heat. If we take some subjustro seld, and pour it into a vessel containing water, the heat thus evolved will at once to seen. When the next of combination goes on very rapidly, light is often produced as well as the least of the terms. In reality, however, it is as much combination when a piece of from slewly reads in the air as when from wire is burnt in oxygen gas; and further, the same amount of heat is evolved during the whole process, whether the combination.

In most cases the substance consumed combines with the oxygen of the air. Heat, however, is produced by other combinations, as, for example, by that of hydrogen with chlorine.

If a little sulphuric acid be dropped upon a nixture of powdered sugar and chlorate of potash, the chemical action will be so intense that sufficient heat will be generated to inflame the mixture: this mode of producing leat is sometimes employed: The ortilary lucifer match is tipped at the end with

a compound which is decomposed at a very low temperature. The friction of the match against the box is sufficient to raise it to this degree, and then the compound inflames and ignites the wood.

5. Vital Latino.—Vital action is another source of beat, the temperature of the human body beat of the surrounding nir. This may, howeve, be regarded as a result of contoustion, for a portion of the food taken into the system is really consumed, that is, its curbon unites with the oxygen of the sir, and by this slow conditionation heat is produced which maintains the temmenture of the body.

unced vanish manuaus rule emplementer or in dropy.

6. Electrical—The only other source of heat which we shall refer to now is electricity. We have seen already how in the income electric pic heat considered to the considered to

EXPANSION PRODUCED BY HEAT.

We have now to notice the principal effects which heat produces on different hodies submitted to its influence. Take a rod, A (Fig. 6), of brass or

eopper, about half-aninch in diameter, and
out a gauge of metal of
the shape shown at B,
so that the rod may just
fit lengthways between
the ends of the gauge,
and also fit tightly in "
the hole, C. If now the
rod be dipped in boiling



water, or held over a source of heat so that its temperature may be raised, we shall find that it will no longer enter gauge nor pass through the hole. It is often, then, that the dimensions of the rod have been inversed by its elevation of temperature, and whus learn that one of the effects of heat is to produce examsions.

Take a flask (Fjr. 7) and fill it with water slightly thirds with littens, fin. or other colouring matter. Fix fit it it tightly fitting cork through which a long glass table has been passed; the water orders the tabe and rices to a certain point, and unatterned. Now warm the fask; gently by means of a flame of some sort—candle or Bunsen burner and note that the level of the water in the table HEAT.

falls slightly, and then begins to rise. The temportry fall in the column of water is also to the exponsion of the glass of the flask, which is first heated; how when the heat has reached the liquid is exponds at a greater late than the glass and the column of water then begins to rise. The evidence of expansion in the water is so apparent in this experiment that one may readily show it to a large

The expansion of metals is also so great that in large engineering works—as, for instance, long iron bridges—allowance has to be made for it, as otherwise the structure would be distorted and weakened.

It is very important, therefore, to ascertain the exact amount of expansion which different substances undergo when their temperature is raised. The simplest means of doing this is to take a rod of the metal, and having placed it so that one end presses against an adjusting screw and the other against the short end of a lever, heat it by means of a spirit lamp. The longer limb of the lever then serves as an index, and shows the amount of elongation. Sufficient accuracy cannot, however, be obtained in this way, as the exact temperature of the bar cannot be determined. The method devised by Lavoisier and Laplace is therefore frequently adopted.

The following is the principle of the decice. A rod of metal, A (Fig. 8), whose rate of expansion has to be ascertained is placed in a trough containing a liquid. The rod rests on glass rollers, and one end presses against the fixed upright rod of glass at r, while the other end is free. As the temperature of the liquid is raised, the rod A B lengthens out,

and the end B approaches M. B in its movement pushes against the arm B o O i, a right-angled lever, N O N, moving on a right-angled lever, N O N, moving on a prive at c, and the long arm O o Is moved the control of t

the long arm of the lever OD we may substitute a telescope to move on the pivot at o in the same way, and with which we may more conveniently assertain the rate of expansion on the scale D. The practical details of the method are as follow:—A metal trough (Fig. 9) is placed

over a furnace between four stone supports, and the bar to be tested is placed in this. A rod of glass is placed between the supports at one end of the trough, so that the bar may press against it. On the top of the other two is a rod turning in bearings, and carrying at one end a telesport. Fixed to this rod is another at right angles to it, which presses against the other end of the

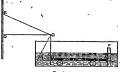


Fig. 8.

bar under examination. An accurately divided scale is placed on the wall of the room opposite to the telescope, which has cross wirse placed in it, so the telescope, which has cross wirse placed in it, so easily be seen that when the root elongates it will turn the axle which carries the telescope, so that by looking through the inter we shall be nike to read off on the scale the amount of deviation, and by an easy colleation learn the exact furcrease in length. The visual my here survey as a long length of the control of the

When an experiment is to be made, the bar is placed in position, and the trough filled with melting ice. In a little time it will have attained the tem-



Fur. 9.

perature of 329 F., and an observation is then made through the telescope so as to determine the degree of the scale to which it points. The ice is now removed, and the trough filled with mercary or oil, and raised to the required temperature. When it has been stationary at this point for a short time, as shown by thermometers placed in the trough, as shown by thermometers placed in the trought as second observation is taken, and in this way the expansion is ascertained. This fraction is usually known as, the coefficient of linear expansion, and in most tables it is given for the expansion between 282 and 2129°F, or the freesing and boiling points of water. The following table shows the extent of this increase for a few common substances:—

Pir							-			m'er
Flint (-						-	23,55
Wlute		١.						-	٠٠.	nte
Piathu	ann	٠	•	•		- /		•	-	71'22
Steel	•	-	٠,		-	-		•		11/1
Cast I:			•	-1	-	•		•	•	zir
Wrong	ht I	on	-	-	•	-	•	٠,	•	rio.
Gold	•	•	-	-	•	•		-	•	zit
Coppe	r		•		•	•	-	•	•	250
Brass	•	٠.	•		•	-	•	•	٦.	110
Lead	-	-	•	٠	•	-	••	•		767

It must be remembered that this table merely indicates the linear finerense—that is, the increase in one direction. Most substances, however, expand, equally in each direction, and then the outlead expansion may be taken at three times the above fractions.

EXPLANATION OF THE EXPANSION OF BODIES. The onlargement of bodies by heat is easily accounted for by the dynamical theory, for, when the particles vibrate more widely, they naturally endeavour to get farther apart, so as to have more space to move in. We may regard the particles of any body as being held together by two opposing forces-cohesion, which tends to draw them more closely together, and heat, which tends to drive them farther apart. If the heat be increased, the body expands a little by its influence, and then, as the particles get farther separated, it assumes the liquid state; and finally, in the case of many substances, the heat altogether overcomes the cohesion, and the particles fly apart in the form of vapour. When the source of heat is removed, and that already acquired by the substance has been imparted to surrounding objects, cohesion again comes into play, and the substance resumes the liquid or solid state.

POLITICAL ECONOMY. VII.

EXCHANGE (continued).

Now it is clear that when payments are spread over a series of years, one of the parties may suffer very much from these fluctuations. If 'I take a ' piece of land now on a ninely-nine years' lease at a ground rent of £100, and gold goes up 20 per cent. in value during the next fifty years, I or my '

successor will then have to pay the equivalent value, not of £100 now, but of £120 now; that is, it will require (other things being equal) as much labour and abstinence to get that £100 as it now does to get £120. The purchasing power of coined money is found to vary little as regards commodities generally from one year to the next, but very greatly when we compare successive periods of years, or times 20, 30, 50, or 100 years apart, So it has been suggested that the standard for such payments, should not be money. It has been found that while corn often varies greatly in value, comparing one year with the next, according as the harvest is good or bad, its average value, as determined by the average amount of labour and abstinence required to produce it, does not vary nearly so much as that of gold or silver. But a more stable standard it is thought might be found thus :- In the present year (for instance) a list . might be made of the price of certain amounts of 'the necessaries of life-a bushel' of corn, half a hundredweight of iron, a stone of meat, so many yards of cloth, and so on, the amounts being probably-fixed by the estimated consumption of an average man for a certain time; the prices might be added up, and the result might be called . "one unit of value," Then deferred payments agreed upon this year might be expressed, not in money, but as so many "units of value, 1899." And it might be agreed that every year the sum payable shall be, not so much gold, but the equivalent of the commodities that were exchanged for so much gold in 1899. The reason for taking several commodities is that the effect of occasional fluctuations in one or more will thus be spread over the values of the whole. This system. is called "the multiple or tabular standard of value," and for bayments spread over a series of years, or deferred payments-for example, loans for long periods-is a fairer method than payment in money.

Few subjects are more complicated than that of the currency, and in an elementary work we can only touch on one or two of the leading points. We must now mention "Gresham's law," or the proposition stated by Sir Thomas Gresham when Master of the Mint in Queen Elizabeth's reign, that "bad money will drive out good, but good will notdrive out bad." That is to say, supposing new sovereigns are put into circulation along with old, worn, and therefore light sovereigns, the old ones will remain in oirculation, the new ones will disappear. At first sight this seems strange. But it is clear that if a sovereign containing gold equivalent to 19s. 6d. will buy the same amount of goods as one containing the full amount of gold 1 ,

required—and unless the costs is carefully weighted in my be impossible to tell its read value—the interest of the holder is to agend the light one, unterest of the holder is to agend the light one. The heavy places are picked out by fewellers. The heavy places are picked out by fewellers. The heavy places are picked out by fewellers. The heavy places are picked out by fewellers the light one repairs. But though one does not continuely weigh coins, yet banks and people who can be to be a support of the people which the people which is the people which is the people when the people when it is deliber melted down for use by fewellers, etc. or, modification of people when the p

others at its nominal or " face" value. The English sovereign, we may note in passing, weights in theory 123-27447 grains of "English standard gold," which is eleven parts fine gold and one part alloy, chiefly copper. As such minute no-currey is impossible in prnotice, a minimum weight of 122 50 grains is fixed, below which the sovereign is not legal tender. The limits between which the weight of the sovereign when issued must lie are 123-074 and 123-474 grains. But savereigns weighing considerably less than the legal minimum have circulated (we take these details from Jovons' "Money"). The "Mint price of gold" is £3 17s. 101d. per oz. troy; this, however, is only a way of saving that an ounce of gold is coined into three severeigns and that fraction which is expressed by 17s, 101d. For "price" means value estimated in standard gold coin; and the "value of so much gold estimated in standard gold coin only menns, since there is no charge for coinage, the amount of coin that is made out of that amount of gold. A shilling contains loss than three-fourths of a

skilling's worth of silver, a penny only about a furthing's worth of bronze (Grows). But as these are only "token coins," no barrier is done, and only "token coins," no barrier is done, the three silvers in the coins, and the coins that there a final through no first coinsign of the standard motal—that is, anymo who has gold buildes in Englished lies a right to trake it to the Miss and the Englished lies a right to trake it to the Miss and of sinoney expansive with the demand for its more expansive with the demand of the control of the coverage with the demand of the control of the coverage with the demand of the control of the coverage with the demand of the control of the coverage with the demand of the control of the coverage with the cover

coings. Sometimes this seigniorage has been considerably in excess of the expenses of coings, so as to be a source of revenue to the State. This

usually involves reduction of the purchasing power of the coin, and unsettles all commerce. The general view money economists is that there should be no seigniorage whatever, because even, the smallest will tend to hinder the supply ofmoney from keeping pace with the demands of increment leads.

The amount of coin, and, indeed, of coin and paper, which different countries use varies enormously, and seems to bear no defined relation to their wealth or commerce. England is a richer country than France, and has a much greater foreign trade; the rate of wages, too, and the general standard of living among all classes are bigher, and there are many more rich cople in England. Yet it is estimated that (about 1885) the United Kingdom had £3 10s, of gold in eliculation per inhabitant, and about £5 6s. of gold, silver. and paper; willo Franco had about £5 gold per inhabitant, and £10 10s. gold, sliver, and paper. The amount required depends partly on the number of commercial transactions, partly on the extent to which banking facilities are developed; thus upwards of 99 per cent, of the sums paid in the wholesale trade in England are paid by cheques or bills of exchange, or other substitutes for each. In no other country, except, perhaps, in some of the Australian colonier, is banking developed to anything like the same extent.

BINCTALLISM. -- It is clear that countries of different degrees of worldh niust neo different standard metals. Thus in England it would be very inconvenient if there were no gold coinage. But in some of the South American states wages are very low, food is cheap, and there are few right people, so that gold coins would have to be inconvenlently small if circulated much. Now when a merchant in a country with a gold standard trades with a merchant in a country with a eliver standard, the terms of their bargain are affected not only by various nanvoidable circumstances producing an unexpected rise or full in the prices of the goods, but by the additional uncertainty whether silver is going to rise or fall, relatively to gold. Again, a railway in Mexico, built with English capital, may fix its fares and rates on the supposition that silver is to gold as 33 to 1; but the relation varies slightly from week to week, and every time silver falls in value the shareholders lose something, and the fear of this loss discourages investment of capital in the silver-using countries, which generally want it most. Again. the Indian Government receives taxes in silver, but has to buy military stores, railway material, etc., in England, which has a gold standard. Every fall in sileer temls to give it less to spent'in England. Yet the matire population is so poor thus the takes, cannot well be increased. An attempt to keep the two the two the to be the value of the Indian silver coining by coining no more has not succeeded well, and the introduction of a gold standard is talked of. But then the mass of the natives will never see any but "isken money."

With the increase of commerce, 100, there is more demand for standard money, and if this. cannot be met prices will full and all payments, especially deferred payments, will represent a greater amount of sacrifice on the part of the payer than they would if prices had remained the same. Bimetallists, therefore, propose that the principal countries of the world shall agree that gold and silver shall be legal tender indifferently. the rate between them being fixed by law, and "free colunge" of both shall be established. It is objected that the actual ratio may vary again; and if so, it would be to the interest of those who have large payments to make to huy up the cheaper metal, get it coined, and make their payments in it. So the creditor would really be defrauled "But," it is meswered, "directly there is this run on the cheaper metal, it will become dearer made, and so the rapilibrium will be restored." The problem would be however, what ratio to start with? Vast new supplies of gold may come in from Klondike and South Africa; or there may be a much larger amount of sliver available than has been suspected. Ten years hence a great overplus of one of the metals may quite upset the balance again *

PAPER CUBICSEY In: arisen from routives of convenience. To keep large quentities of gold resilier stured one must be well (and expensively) uncorrected against nobbers; to earny about the unmount required for lance payments would require larges and carts and porters. So a neston unseof transferring the lambers receipts for its just isposely now also sell ranges of goods hamselve from land to land) the stock warrants which entitle the tower may be a sell to be a sell to be a sell to be a converse to relain the engages. And it is great waster to use on expensive metal like gold when we can see more trusted. But when can we do set?

For paper money to maintain its value, there must be absolute security that it can be converted anto com on demand. This is effected in most

I is the Providental coursed in the Einst detailer (1998), the Demonstrest experted "for remainer" of fisher all attails of I to 155, on the present left features and others had become though the other task teal beside at the rather; it that store become only "toden ment," and cold had jone up relatively to atther goods. So the debtor had raily they read to our rarest fant todes as much as he had constructed to quy. They were unsuccessful.

countries by prescribing a certain reserve which the banks that issue notes are compelled to keen and limiting their issue to a certain amount. This in England is done by the Bank, Charter Act of 1842. This (1) limits the note circulation of all banks which were issuing notes at the time of its passage to their average issue at that time; and, us it happened that no London banks but the Bank of England and headly my joint-stock banks were then issuing notes, the privilege of note issue in England is now enjoyed only by a few private bankers in the country, and by the Bank of England. (2) The notes of the Bank of England are alone legal tender. The Bank is allowed to have £14,000,000 of them in circulation at any one time without my stipulations as to the amount of coin it must hold. But for every note over £14,000,000 (with certain exceptions we need not here state) there must be an equivalent of gold in the Bank. Thus it does not pay the Bank to have more than £14,000,000 worth of notes out. Up to that amount it has the use of the coin which is publ into it in exchange for the notes, or which it would have to nev out to its crediturs were they not in existence. It is known by experience about how many notes are likely to be presented for payment in gold in a given time. and coungh is kept to meet these demands. The test is invested in various ways. The Bank gets interest on it, and so secures a revenue from wealth which, but for the privilege of note issue, would otherwise be lying idle. But on every note issued over the limit there would be the loss of just the amount of revenue which might be derived from the use of the coin which has to be kent in reserve to meet it.

The object of this Act is approachly to much manish the duapier's "inflation." It is bank our leaves in many notes as it likes, it will probably it is thought, bend them freely to specialistics. Notes will then be Issaed in sexues of what the country wants, and will constantly be returned to the lank for payment. In coin. The tents will find it difficient to patenter with commit to meet them; the supplied that something is wrong will make everyone who inside most set to get coin for them; and though banks may profess to pay every note on demand, it to appeal their mosts, and more their would be for a pay all their mosts, and more their would be not posit in its singe notes. So the tenk may break, and holders of it is notes suffer nevery loes.

As a matter of fact, paper promises to pay which are menty as good us the notes of many bankcau be exceed so easily that it is doubtful if the Act really checks speculative lemling at all. In special cases it may be suspended by the Government, i.e., the Bank of England may be allowed temporarily to issue notes over the limitwithout having an equivalent in coln. We shall see why when we come to consider commercial crises. In some countries the Government issues incom-

rertible naner money, that is, notes which profess to represent so much coin, but for which coin will not be given on demand. (Often, however, the notes contain a promise that this com will be paid for them after a certain date some years from. their issue.) This is, indeed, a favourite resort of Governments in difficulties, and were at absolutely certain that the notes would be paid as promised, and that the supply would not be allowed to. exceed the needs of the country, it is just possible that these notes might maintain their nominal value. But nobody orn say even approximately low much money use country does need at any time. It depends partly on the amount of trade, partly on the amount of separate payments, wholesale and retail, partly on the extent to which banking facilities are developed and people will take obcomes and bills of exchange, etc., instead of notes or coin, and on other conditions. Nobody ean measure the relative influence of these conditions at all. And if the Government has more expenses than were expected, it is only too easy to issue more notes, and hope that something may turn up to enable them to be paid some years hence. Now bruk-notes are not usually employed in payments between country and country. Practically the arrangements of foreign trade we shall have to describe presently make international trade barter of goods for goods, and it is only when the values do not balance that money is sent to make up the difference. But this is coin and not bank-notes, because doubt about the solvency of a country is more free to find expression abroad than nt home. Where, therefore, inconvertible notes and gold are both legal tender, the gold is a little more valuable in any case, because it can be used more freely for foreign payments, and in necordance with Gresham's law the worse money drives out the better. And, of course, the more of these notes that are issued, the lower their value is compared with gold. Gold then goes to a premium, and the fluctuations of this premium-almost always increased by speculation and affected by daily political events-make the real purchasing power of the notes quite uncertain, inflict the utmost hardship on their holders, and upset all monetary transactions. Thus, during the War of Secession in the United States, both sides being hard pressed for funds, issued inconvertible paper money. Gold at once went to a premium in both. In the North it reached 240-that is 240 dollars in paper were equivalent to 100 dollars in gold. As , months.

prices naturally could not follow all the fluctuations of the premium, and as it fluctuated from hour to hour-rising and falling during the progress of a battle as the telegrams were unfavourable or the reverse-no one quite knew what a sum of legaltender money due the next day would really be worth when it came. In the Confederate States the value of the paper dollar fell steadily as the prospects of their success grew worse, until at last one heard of a pair of tronsers selling for 1,100 dollars, a pound of sugar for 100, and so on? Eventually, the notes issued in the North were paid in specie, but the fluctuations meanwhile caused great loss to some and enormous profits to others. Under such a system the few clever people who understand the subject. and can see how things are likely to go, can make their futures at the expense of the great mass. Thus manufacturers on the Continent have been known to express pleasure at the issue of inconvertible paper, because their customers, large wholesale dealers, knew that the paper was worth less than gold, and so submitted to pay increased nominal prices, but their workmen did not find it out, and so contentedly took the same apparent wages as before. And, of course, the manufacturers pocketed the difference.

In dealing with paper substitutes for money, we have first mentioned bank-notes. We may nest summing cheepes, which are fear most people knowly orders on stank to pay a certain sum money in that bank—that is, who is a creditor money in that bank—that is, who is a creditor of the nank to at least the sum mentioned. These are transferable by endorsoment, and might, therefore, be orientated like bank—that (though this does not usually happen. A more important substitute is rounding usually somewhat has follows:—

Three months after date pay to the order of John Jones the sum of One Hundred Pounds value received.

THOMAS ROBINSON.
TO WILLIAM SMITH.

WINGING CALL

William Smith on receipt of this "necepts" the bill, £c., writes "Accepted," and the date of payment. nerves it, and signs it. On the face of it, this document means that W. Smith owes T. Robinson a certain sum, and Robinson owes that sum to Jones; and that it is more convenient for Robinson to tell Smith to pay Jones than to pay Jones himself and collect his dolt from Smith; and Smith by signing acknowledges the debt. But he sum actually paid by the bill is not 2100 cash, but the sum that would produce interest enough to but the sum that would produce interest enough to a C2100 cash if the westeen for three mones to up to 2100 cash if the westeen for three mones to up to 2100 cash if it were lent for three mones to up to 2100 cash if it were lent for three mones to up to 2100 cash if it were lent for three mones to up to 2100 cash if it were lent for three mones to up to 2100 cash if it were lent for three mones to up to 2100 cash if it were lent for three mones to up to 2100 cash if it were lent for three mones to up to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash if it were lent for three mones are supplied to 2100 cash it were lent for three mones are supplied to 2100 cash it were lent for three mones are supplied to 2100 cash it were lent for three mones are supplied to 2100 cash it were lent for thre

These bills are largely used in commerce in the payment of debts at a distance, as in another country. They were often used, when usury laws country. They were often used, when wany more were increase, to evade them. For nobody, except the parties, could tell what the original "value received" for the sum stated had been. They are transferable by endorsement, and if the names on them are those of persons of known credit, no difficulty is found in circulating them. Frequently they used as means of raising money on the joint credit of the parties signing, and are then called accommodation bilis; but with this use we are not hore concerned. They can always be converted into cash before they are due for payment. A sum is then deducted from the free value representing the interest that with the original sum would make up £100 at the date mentioned; semothing for mmission, and something as insurance against the risk that the bill will not be paid-a sum which, of course, varies widely according to the business reputation of the people whose names are on the bill. Of the other influences affecting the rate of discount we shall sucuk shortly.

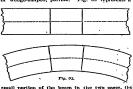
Between distant places or foreign countries the place of money is often supplied by "telegraph drafts" or "eable transfers"—which may be desoribed as orders sout by telegraph to make payments which are balanced against orders sent the reverso way. Thus, if bank A, in London, tele-graphs to its correspondent B in New York to pay £100 to Messrs, X, which a debtor of X, in London, has lodged with thom, and B telegraphs to A to pay £110 to Messrs. Y, due to them from a debter in New York, accounts between B and A can be sottled up by B paying A £10. This sort of presottled up by B paying A £10. This sort or pro-cess, only infinitely more complicated, is going on always between every two commorcial countries in the world, and by its means an immense eco-nomy is effected in the use of coin, and the risks attending its transmission are avoided.

APPLIED MECHANICS.-XV. [Continued from p. 27.]

BENDING OR FLEXURE-STRENGTH AND STIFFNESS
OF BEAMS-PRACTICAL RULES, ILLUSTRATIONS AND EXAMPLES. A LOADED beam is strained; and if we wish to

have an illustration of the nature of the stmin, we may use a material which yields readily like indiarubber. We can then study the phenomena of bending when manifested in an exaggerated form. Let the outline of two plane sections be drawn on the beam, at right angles to its length; when the beam is unstrained, these sections will then, of

course, be parallel. When the beam is loaded it will be seen that the sections approach nearer on the loaded or concave side of the beam, and are further apart on the convex side than before, the edge view owing two straight lines enclosing a trapezoidal, or wedge-shaped, portion. Fig. 92 represents a



curvature in the second case being much exaggerated. We have in this a rough illustration of the fact or assumption on which all the laws of bending are based, viz., that sections which were plane before bending remain plane after bending. The theory tousled on this assumption gives results agreeing exactly with experiment, and hence it may be taken as an estublished fact.

If plane sections remain plane, we see at once that the stress due to bending, near the concave or londed side of n beam supported at the oads, is greatest at the surface, diminishing regularly towards the centre of the section, and ugain inc towards the surface on the other side. the stress being in the first ease com-

pressive, and in the second case tensile. Fig. 93 illustrates this, ed being the edge viow of a section before, and c'd' that of the same section after, bending takes place; the portion abd'e' being half the trapezoidal portion included between two sections which were par-allel before bending. It will be seen that there is a surface or region somewhere near the middle of the beam where the fibres are neither extended nor compressed; this is called the neutral surface, and its

elevation or soction is the neutral line. The position of this neutral line in any section . is of some importance. This will be referred to later on.

Fig. 93.

We have referred only to compressive and tensite stresses due to bounding; but in beams in actual use something more than pure bonding occurs, which would be produced if the beam were acted on by equal and opposite couples at the two ends; in fact, there are sketzing forces at a person to just in ording beams such as those used in building operations, the shorting forces are usually commercially as the

All the laws of bending follow directly from the conditions of equilibrium for a number of forces not acting through one point. It may be well to state

these conditions. They are—

(1) That the algebraic sum of the vertical com-

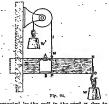
ponents of all the forces shall be zero.
(2) That the algebraic sum of the horizontal

components of all the forces shall be zero.

(3) That the algebraic sum of the moments of all

the forces about any assigned point shall be zero.
The terms "horizontal component" and "vertical
component" were explained at page 339 of Vol. V.
The first condition applied to a horizontal beam

The first condition applied to a horizontal beam supported at the cuds, and honded (as beams usually are) with vertical loads, shows us that at any vertical section there is a resultant tanguntal force noting which balances the forces applied to the beam to are side of the section. In these forces we, of course, include a supporting force, which can be found as explained in an earlier lessofs. This tanguatial force is the shearing force referred to above, and an illustrating of its action can be obvound as explained in an end of the action can be obtained by the use of a model such as that shown in Fig. 9, 1, in which the shearing force is



represented by the pull in the coint at, due to the weight w, which is equal to w together with the weight of the portion FMN of the beam. The model also shows the action of the Yeasile fores at E. due: to beading; the little prop at II, not being fastened in, would drop out if not acting as a strut, whilst

the chain at a can only exert a pulling force. If the beam were supported at the ends and loaded in the usual way, the chain and prop would require to be interchanged.

The second condition of equilibrium does not apply to external forces in the usual case, as the loads are vertical. If applied to internal forces, it gives us the position of the neutral line in a section.

gives us the position of the neutral line in a section. Referring again to Fig. 93, we see that the strain (elongation below and compression above the neutral surface) is proportional to distance from the point

H. or neutral line. Let y be the distance of any assigned little area in the section from H; then our assumption about plane sections remaining pinne leads at once to the

conclusion that strain is proportional to y. But by Hooke's law stress is proportional to strain: hence, stress is proportional to y, or is equal to py, where p is the stress at unit distance

from the neutral line. Let α be the size of our little area. α being an exceedingly small fraction. Then, the force on α is stress $\times \alpha = \alpha p p$, and our second condition, applied to the forces acting on all the little areas

$\Sigma apy = o$, Or, $p\Sigma ay = o$.

in the section, is that-

This condition can only be true if the sentral line passes through the centra of area of the section. The student will see that this is so if he consults the shortreference to "centres of gravity" given at page 281, Vol. VI.

How, for instance, would the distance of the centre of any area from a given line be obtained? By multiplying each little portion of the area by its distance from that line, and dividing the sum of all these products by the whole area; in other words, the distance required is $\frac{2\pi g}{2\sigma}$. But if $2\pi g = \sigma$,

the expression is o, and the distance vanishes, or the line from which we measure passes itself through the centre of the area.

Do not forget, then, the important result regarding the position of the neutral line in any section of a beam.

The third condition, applied to external forces to one side of the section and the internal forces which balance them, gives us the rule for the strength of a beam at any section.

The bending moment, represented by M₀, is the algebraic sum of the moments of all the extremal forces to one side of the section, taken about a point in the section, and it is balanced by the moments of the internal forces, or moment of traintance.

The force on any little area a is apy, and our

, bered.

third condition of equilibrium append to the case shows us that if moments are taken about the neutral line, . . . / $x_{\rm cpp} \times y = x_{\rm b}$.

Or,
$$p \exists mp^2 = Mb$$
.
Or, $pl = Mb$.

t being the moment of inertia of the section about the neutral line. This moment of inertia will be different from that used in questions on torsion, as the moment of inertia in the latter case is taken about a line through the centre of the section of right angles in its plane.

If p is the stress at unit distance from the neutral line, and f the stress at distance y from it,

$$py = f$$
, or $\frac{f}{y} = p$,

hence our rule for the strength of a beam be-

$$m_b = f_L$$

This important rule should be carefully remem-

If we want the greatest bonding moment a beam will stand at any given section, we must make of the greatest stress—of this kind—the material will stand, and y the greatest distance of any point in the section from the neutral line.

The strength rule is sometimes given in a slightly

different shape. Thus, let $\frac{1}{y}$, the moment of inortia divided by the greatest distance y, be called the shringth wood slue of the section; then the greatestsite bentling moment is obtained by notifylging the the greatest step stress of the material by the strength the greatest step stress of the material by the strength the stress f_i here referred to, is not smelly that the stress f_i here referred to, is not smelly the same as the ordinary tensition or compressive stress of the material; it must be found by experiments on bending

The values of the moments of inertia and strength moduli of some common sections are given in Table I.

TABLE I.

Moments of Inertia and Strength Moduli of Sections.

Section.	Mament of Inertia about Axis shown through centre of Area.	Strength Modulity of Section.	Section	Moment of Inertia about Axis shown through centre of Area.	Strength Modulus of Section.
Hectangle.	for(1) 122	14 15		<u>133 4- Indi</u> 2	141) + 19-14
1-6-1	84 12	<u>ਲ</u> ਫ	猫裤	$\begin{aligned} bh_2 & \left(\frac{h_1 x}{12} + h_1 x\right) \\ &+ b_1 d_1 \left(\frac{d_1 x}{12} + h_2 x\right), \\ h_2 &= \frac{b_1 d_1 (d_1 + b_2)}{2(b_1 b_2 + b_1 d_1)}, \\ h_1 &+ h_2 &= \frac{d_1 + b_2}{2}. \end{aligned}$	
Square	5* 12	0 11815	Combinations of Rectangle.	$h_1 + h_2 = \frac{d_1 + h_2}{2}$.	
	10 10 10	$\frac{id^2-h_1d_1^3}{6l}$	Hexagon,	0-4125+	0.21492

Section.	Moment of Inertia about Axis shown through centre of Arra;	Strength Modulus of Section.	Section.	Moment of Inertia about Axis shown through centre of Area.	Strength Modulus of Section,
Octagon.	o øsr	o coR	D Circle.	⁰⁴ (D₁ − d₁)	# (D1-d1)
1	$\frac{Lp^3}{3G}$. $\left(h = \frac{p}{3}\right)$.	<u>bp²</u> 34	Semi-circle.	$\begin{pmatrix} 0.11R^4 \\ \left(h = \frac{1}{3} \frac{R}{\pi} = .42iR\right) \end{pmatrix}$	0-191R ^a
Triangle.			Ellipse.	# 04 bel 3 .	- 7 32 bd≠
	$\frac{c_1}{c_4} = .0151$	$\frac{\pi^{2}}{32}$, $\left(\frac{\pi}{32} = 10052\right)$	1	7/1 + 11/2 64 + 11/2	,

For some rimple shapes of section, such as the rectangular shape commonly used for timber beams, the strength rule may be put in a simpler form.

Our strength rule may not be true for loade exceeding the elastic strength of the beam, but if beams of different lengthin, breadths, and thicknesses are tasted up to breaking, all supported at the ends and loaded at the centre, it will be found that the breaking load wis proportional to the product of the breaking load wis proportional to the product of "versely proportional to the length of the beam. Hence the rich may be written."

where K is a number obtained by experi-

If the beam is leaded and supported in any of the five other ways referred to in Table II, the method of leading and supporting must be taken into account, and the rule is therefore—.

TABLE II.

Relative Strongths of Beams, supported and loaded as indicated.

Method of Londing and Supporting the Beam.	Greatest liending memeat Total lend in excit cos word length of beam = L	Relative Strength.	Relative Definition. D.
Fixed at one end and }	W	-23	10
Fixed at one end and) loaded uniformly all along its length	W1 2	*5	6
Supported at both ends and loaded in the middle	W2 4	1	ı
Supported at both ends and loaded uniformly	WZ S	2	-025
Fixed at both ends	· Wt	3	-25
and loaded um-	W1	3	-125

In this, all dimensions must be taken in inches and loads in pounds.

The rule then is: the load which will break a beam of rectangular section, i inches long, i inches

broad, and dinches deep, if loaded and supported in my of the six ways shown, is found by smiltiplying the proper values of the constants a and 'x together, and multiplying their product by the broadth of the beam in inches, the space of its depth in inches, and dividing by the length of the free part of the beam in inches.

Values of C are given in Table II., and values of . K in Table III.

TABLE III.

Material.	Value of K.	Value of 8 (deflection) = $\frac{1}{1E}$.
Engirsh ook n fish Took	0,050 8,050 9,180 9,180 6,529 5,000 4,180 5,000 6,529	Totalion
Muliogany		S-5 imblies
Cost from	1	1t2 million os inflion
Cart mass	1 11,000	41 million

METEOROLOGY -- I.
INTRODUCTORY REMARKS -- THE ATMOSPHERE:
ITS CONSTITUTION.

Alextonistors is the scheme of the atmosphere, of what Artsdotk, the first systematic swifer on the subject, called via perlaps [fer mitizine]. The things above the cards. All our out-door practials depend above the cards. All our out-door practials depend to the cards of the card of the card of the atmosphere as whiter, one than atmosphere as whiter, one can be atmosphere as whiter, and on which almost everyone, probably from the cardiest times, how made observations more or loss solicitific, and have formalment applicates. The state of the observation is the cardiest and the cardiest times, but of the observation are considered as weather of the observation of the cardiest and the lagrance, and the cardiest and the cardiest are sensitive to honely signs to go by. Alimaha are sensitive to coming changes of weather: sea-birds flying inhand on the approach of storm, marsh-birds seeking higher ground, swallows and rooks flying low, frogs croaking, cows 'lying down, and sheep huddling together under hedgerows.

No scientific study of the atmosphere, however, was possible until the invention of such instruments for measuring its various characters as the thermometer and barometer, inventions which date mostly from the seventeenth century. The state of the air is affected by such a variety of local circumstances. such as altitude, proximity to the sea, aspect, soil, etc., that even long-continued and necurate observations at isolated spots tell us little about the general laws of atmospheric action, and will not enable us to predict anything of the weather for any longth of time in advance. We are at the bottom of the atmospheric ocean, and from one spot can learn little more of it than an oyster could learn of the Atlantic. In modern times extended travel and widely scattered observers have facilitated such generalisations; whilst still more the electric telegraph, by enabling us to compare the changes in the atmosphere at almost every part of the earth's surface almost at once, has given us the power of predleting the rate and direction in which these changes are likely to be transmitted,

Humbold's work on isothermal lines, published; in 1817, was the first scientific treatise on meteorology, and Dove's great work on the distribution of heat on the surface of the globe, published in 1852, by rathing up numeurous observers in all parts of the world, was even more important in popularising the science.

Opinions are hardly agreed us to the leading subdivisions of the province of meteorology. It is sometimes divided into climatology, the science of weather and cosmical nucleorology.

By climate is useful the local introspheric conditions which determine the suitability of various districts for the support of vegetable and animal like 1 is parelleafly determined by the temperature and moisture of the alr, and those in their turn by the prevailing varials, they deriving their temperature and moisture from the regions they have truversed. Thus, when in 1850 love first showed that the prevailing which are simply the result of the relative distribution of the masse of pressure of the atmosphere, and that their direction and force to the state of the superior of the same of the towards one of the superior of the same of the towards one of the superior of the same of the towards one of these pressures, or from where there is a surplus of air to where there is a deficiency, he furnished the key to the value occusion of climate.

By reather is understood the state of the air at any time as respects heat, moisture, wind, rain, cloud, and electricity; and a change of weather implies a change in one or more of these conditions. Most of these changes also find their explanation in the distribution of atmospheric pressure.

Cosmical meteorology considers the physical conditions of the atmosphere, and their relations to likely, heat, electricity, and magnetism.

As all meteorological phenomena are referable in the long run to the action of the sun, a second subdivision of the science has been proposed into the study of diurnal changes, i.e. those dependent on the carth's rotation, and that of annual phenomena, i.e. those dependent on its revolution.

In our lessons on Physical Geography (Vols. I. and II.) we have already dealt to some extent withthe conditioning causes, the modes of observation, and the results of meteorology, especially in lessons III. and IV. (Vol. I., pp. 141-146 and 208-214) and in lesson IX. (Vol. II., pp. 164-167), so that we need not repeat what we have there said, these lessons being, as it were, supplementary to those in one special direction. After a few remarks, therefore, on the earth's movements, we shall pass on to the atmosphere and its composition, and shall then deal in succession with its temperature, pressure, movements, moisture, electrical and optical phenomenn, treating under each of these heads of the instruments and other means by which the characters of the air are observed and measured, and of the geographical distribution of these phenomena.

The facts that the earth is only 90,436,000 miles distant from the sun on January 1st, whilst it is 93.564.000 miles distant on July 1st, that the earth consequently travels faster through the half of its orbit when it is in perihelien or nearer the sun than through the apholion half, and that we in the northern hemisphere have our winter in the former or perihelion half of the orbit, cause the interval from the spring to the autumn equinox to be 184 days, whilst that from the autumn equinox to the spring equinox is only 181 days. Though, however, the sun is thus three days longer over the northern hemisphere than over the southern in its apparent motion round the earth, the resulting greater length of our northern summer is more than compensated for by the greater proximity of the earth to the sun during that of the other hemisphere, so that the southern summer is actually warmer than the northern.

The most important general or cosmical agency affecting meteorological conditions is undoubtedly the inclination of the cartri's axis of rotation at an angle of 23° 27° 44° non the persendicular. This gives us the seasons and divides the carth into zones as to light and heat. On June 21st, the longest day or summer solstie, the sun receives his greatest

northern declination of 2310 N., appearing vertically overhead at pinces 2310 of latitude north of the equator and remnining above the horizon in the latitude of London (5110 N.) for 16 hours 34 minutes. Then, as we have seen (loc. cit.), he turns southward and the days shorten till on September 22nd he stands over the equator, and we get the autumn equinox; and on December 22nd, the winter solstice, he attains his greatest southern declination of 23,0 S., and we have our shortest day, one of T hours 47 minutes. Thus the length of the day is dependent upon latitude; and we have in this respect, and therefore in the total amount of light and heat from the sun received in each region, a untural division of the earth's surface into five zones. Within the Torrid Zone, i.s. for 2830 on either side of the equator, the length of the days is almost uniform throughout the year. In each Temperate Zone, 43° wide, i.e. between either Tropic and the Polar Circles in lat, 66%, day and night vary considerably in length; whilst in the Frigid Zones, i.e. within the Arctic and Antarctic Circles, the sun during part of the year is more than twenty-four hours below the horizon, and at another season more than twenty-four hours above it.

The more nearly vertical are the sun's rays in falling upon the earth's surface, the more will their heating power be concentrated upon a limited area, and the less thickness of the dense lower strata of the atmosphere will they have to pass through,

Thore are, however, two causes, the combined action of which is to render the five latitudinal zones by no means regular zones of temperature, Firstly, the specific heat of water, i.e. the quantity of heat which it requires to raise its temperature 1º C., is much higher than that of land, whilst its power of radiating heat is far less; therefore the effect of the sun's rays upon water is communicated to the air above it far more slowly than is their effect upon land to the air above it. Secondly, nearly four-fifths of the earth's surface being covered by water, and this oceanie envelope being very irregularly distributed over the surface of the globe, though mainly over one hemisphere, it follows that the effect of the snn's rays will be very unequally transmitted to the atmosphere, quite independently of the five latitudinal zones. It must be remembered that the temperature of the air is more dependent upon this unequally radiated heat from the earth than upon the direct effect of solar heat (see Vol. I., p. 144); but this is a point to which we shall allude further.

Having thus far supplemented the lesson on the earth as a planet (Vol. I., pp. 62-65), as bearing on meteorology, we need add nothing to the description of the composition of the atmosphere given

on pp. 141-142 in Vol. L, save the remark that; of all the varying ingredients of the mixture which we term air, the most important from a meteorological point of view, that is, as modifying temperature, pressure, and weather generally, is the water vapour. Dove described the whole atmosphere as a still, of which the sun is the furnace, the sea the boiler, the cool upper regions of the atmosphere and that of the temperate zones the condenser, whilst we, when it rains, catch the liquid distilling over, This water vapour is invariably present in natural air. It is in a great measure athermanous, or impervious to heat, and thus restricts both the direct access of solar heat to the earth, and the radiation of heat from the earth into space. Its variation in amount changes the weight or pressure of the air, and it is constantly passing, under changing conditions, from the vaporous to the liquid or solid state, or back again into vapour. · Its measurement forms, therefore, one of the chief divisions of meteorology, which we shall deal with in a subsequent lesson.

LOGIC.--I. INTRODUCTION-MENTAL OPERATIONS-TERMS-

MANY persons entortain a preindice against the study of Logio, believing it to be either so difficult that it is beyond the reach of ordinary intellects, or else so useless as not to be worth any labour it would cost. From the tone and abstruse style of. many even of the professedly elementary books upon the subject, this perhaps is hardly to be wondered at; but our aim in these lessons will be, by presenting a few of the broad outlines of Logic before our readers in as plain and simple terms as possible, and by pointing out the practical benefits to be derived, especially in self-education, from some acquaintance with its principles, to show the real groundlessness of such opinions; and, by so doing to induce some of our readers to pursue the study for themselves, and so acquire an amount of intellectual training the possession of which they

PROPOSITIONS.

What, then, we must inquire at the outset, is Logic1—a question which, it used be admitted, is much easier to ask than to answer acourtely and concisely. From the time of Aristotle, the earliest systematic writer upon logic, hardly any two persons have been quite agreed upon its definition or the mode in which it should be treated. Even to enumerate these definitions and views would be impossible, and we must be satisfied with trying to get a general dick, which may be pomularly intelled.

will always find valuable.

ligible, of the subject and aim of Logic, as it is regarded in modern times.

Until comparatively lately Logic was treated of by most writers as the Art of Thinking, a conception too vague and wide to be expable of realisation. The late Archbishop Whately, who contributed at least as much as any other writer to restore Logic to the place which it should occupy in education, regarded it as the science and the art, not of thought or thinking in general, but of one only ont of the many branches of thinking-of Reasoning. So far as it institutes an analysis of the process of the mind in reasoning he views it as a science, and so far as it furnishes practical rules. derived from those principles, for guarding against a erroneous deductions, he views it as an art. One of the ablest thinkers of modern times, John Stuart Mill, defined it as "the science of all the operations of the understanding which are subscreient to the estimation of evidence, or, more shortly, the science of evidence or proof," This view, it will be seen, embraces a much wider field than Archbishop Whately's. . Without, however, oritically examining these or any of the other numerous 'definitions of Logie, it will be sufficient for our present purpose if we understand that it aims at investigating the principles which every thinker observes (consciously or unconsciously) in reasoning, when he reasons soundly, and at deducing, from them rules to guard against error or carelessness in the process of reasoning. So far as the former aim is concerned, we may regard it as a, science; while, in reference to the latter aim, it may be considered as an art. A science treats of theoretical or speculative knowledge only, while art is the application of knowledge to practice; the study of a scionce may be nothing more than pleasant, the pursuit of an art must possess some practical utility.

It is generally laid down that the operations of the mind are three-Simple Apprehension, Judgment, and Reasoning. This is a statement the meaning of which we must clearly understand. It may, perhaps, seem strange to be told for the first time that it is possible to find any system or principle of classification amongst the different thoughts and ideas which are always passing, apparently at random, through our minds. It may seem that each idea and operation of the mind is so unlike every other that it must be impossible to group them into classes possessing any features of resemblance.'. Reflection and analysis, however, have proved the contrary; and the three divisions above given ultimately include them all. Simple apprehension is the operation by which the mind receives ideas. This it does through various

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channels-through sight, hearing, and touch, for example. But whatever may be the means through which the idea (using this word in its popular acceptation) is conveyed to the mind, the faculty or operation which the mind exercises in merely receiving it is called Simple Apprehension. When the mind has thus got ideas, it does not rest there; it compares them one with another, and determines whether they agree or disagree. For instance, having thus received or apprehended the ideas of fire and heat, it compares them, and pronounces that they agree; or the ideas of iron and softness, it compares these, and pronounces that they disagree. The result in each case is expressed in a judgment-in the one, "fire is hot," and in the other, " iron is not soft," Judgment, then, is the comparing together in the mind two of the ideas got by apprehension, and pronouncing that they agree or that they disagree with one another. A third process yet remains. A person after he has propounced the judgment of agreement, "that is a fire," may join this (in a manner subsequently to be explained) with a previous judgment, "fire is hot," and conclude from the two combined "that is hot." When this is done, the mind has gone through a process of reasoning. So, too, in the other example given above, the reasoning faculty will have been exercised if, from joining the two judgments, "iron is not soft," and "that is soft," we conclude "that is not iron." 'Reasoning, then, may be defined to be the act of the mind in proceeding from certain judgments to a third founded npon them. .

Language, even if not (as some think) the only means by which all these several operations of Apprehension, Judgmeit, and Ressoning one be carried on within the mind, is, at least, the means we are obliged to use in communicating them to others. We shall, therefore, consider the different ways in which the notions gained by these operations are expressed in language.

Briefly, an act of Apprehension is denoted by a form; an act of Judgment by a proposition; and an act of Reasoning, by an argument (called, as we shall subsequently see, when expressed in the particular manner required by the rules of Logic, a sullegism). Each of these must be examined

A tem (or name, as it is called by some) may consist of one word or of several, according to the sound or sounds used in each particular language to express the idea or object for which it stands. In our own language (as, indeed, in most others) the vast majority of terms consist of single words; and it is necessary to gain some jusight into their uitport and classification before we can proceed farther with our study of Logic. This will be obvious, if we consider that the knowledge thus gained will enable us to understand the meaning and analysis of Propositions, (which are expressed in words), and to guard against many errors and defects which otherwise nalget creep into our Reasoning (which we must also carry on through the instrumentality of words).

J. S. Mill defines a term as "a word (or set of words) serving the double purpose of a mark to recall to ourselves the likeness of a former thought, and a sign to make it known to others"; and it hardly seems requisite to expand this definition." Terms have been divided into a number of classes, of which the following are the principal:

(1) Into singular (or individual) and common (org operat). As singular term is one which is one which is one with its off of met thing. As ingular term is one which is off of the off met thing. pea, "Jolins Cesar," "city of London," "this stone." A common term, on the ther hand, is one which is capable of being truly affirmed in the same sense of an indefinite number of things—(s., of all those which belong to the class for which the term stands—e.g., "emperor," "ety," "stone."

(2) Into concrete and abstract.—When a term stands for a thing it is called concrete; when for an attribute of a thing, abstract. Thus 'wise," "black," "man," are of the former class, and "wisdom," "blackness," "humanity," of the inter. (3) Into positive, negative, and privative. A

tem is positive which denotes the presence of a certain attribute— $e_{f_{t}}$, "malence," "man," "seeing," and one which denotes the absence of an attribute is called either negative or privative, according as the thing is considered as one which might be expected to possess the particular attribute or not. Thus "impatient," "not-man," are negative term; but "billid" is prustive, because, in addition; to denoting the absence of the attribute "sight," it also implies that that is an attribute without has been possessed as a surface of the attribute "sight," it the human being or animal to which the term may be amulied might be expected to have had.

(4) Into absolute and victive—A term is absolute which donotes an object considered by itself, without being viewed in relation to other objects. Wham, for instance, does not imply in its signification the existence of any other object than the one for which it stands. Hence it is called absolute. A relative term, on the other hand, denotes an object viewed in relation to some other object, which, in its turn, is viewed in relation to the first, and has a name given to it from the

* "Term" means boundary. it was so called because the simplest propositions are resolvable into two terms (connected by a copula.) See next page. relation between the two. Thus "father" und "shorter," are relatives; and each term in the different pairs is called the correlative of the other. (i) Into connectative and non-connectative .- These words (which are derived from the Latin) me "marking along with," and "not marking along with " respectively. The first name is applied to terms which, besides denoting an object, sorve also to mark or imply some attribute of that object. Terms to which the latter name is given denote the object in the same manner as the former, but do not, like them, imply in their signification any utribute of the objects for which they stand "hus "white," "virtuous," "capital of England," Emperer of Frauec," are all connotative terms as in addition to serving to mark and stand for the particular things or people to which they are applied, they also com-note at the same time the attributes of "whiteness," "virtue," "being the engital of England," "being the Emperor of France," which belong to them. "Whiteness," "virtue," "London," "Napoleon," are, on the con-trary, of the class of non-connectatives as each denoting an object only, without serving also to mark any particular attribute thereof. It will appear, from what has been already sald upon

and all abstract common forms to the latter.

(b) into misrael and agricular,—Strictly spating, these are not two kinds of terns, but two modes of supplying them. A term is applied nativosally with respect to all objects to which it could not be applied in the same same. It is applied nativosally with respect to all objects to which it respect to all objects to which it respect to all objects to which it respect to all objects to make a proper or the same of the same of the same of the same of the same objects, and same of the s

stract and concrete terms, that all concrete

common terms must belong to the former class.

it is applied to some one of these, and to a certain measure of weight. By way of recapitulation in a tabular form, we may say, then, that terms may be classed as

There are several other divisions both of terms and of the method of employing them which it is unnecessary to onnmerate here. Those given nboyoare the principal, and will be sufficient to enable the reader to understand the remarks which follow.

We have next to consider propositions. A

Proposition is, as has been already said, a "judgment expressed in words," or we may describe it as a sentence which pronounces that one of two objects or ideas agrees or disagrees with the Let us take a very simple proposition and analyse it—e.g., "Man is an animal," Here, in the language of logicians, "man" is termed the subject;
"an unusual" the predicate, and "is" the copule. The Subject is in every instance that which is spoken about, that with which something is prononneed to ngree or disngree, that of which some-thing is affirmed or denied. The name of Predicate (a word derived from the Latin, and meaning "to assert") is given to that which is said of the sabject, that which is pronounced to agree or disagree with it, that which is affirmed or denied of it. The Copula is that which indicates the act of jadgment, which pronounces whother the subject and prodicate agree with one another or not. This must always be "is" or "is not"; and if the predicate and copula are combined together into one word, as in the proposition "thu fire burns," it may be resolved into the copula and participle-s.g., "the fire is burning." The sab-stantive verb "to be," when thus outployed as a copals, it may be remarked, does not necessarily include the idea of real existence-eq., "the centaur is a fletitious animal," in which sentence the copula joins together two terms, each of which stands for a non-existent object. Propositions are divided into soveral classes, the

first and most obvious division being Into diffrastive and negative. An agir-matire proposition is one in which the preclicate is additioned of the owner of the additional proposition is desired for the subject. Thus, "lead is heavy" is affirmative, "stones are not light," negative. This is called a division necorting to ganifity.

We may also divide propositions into estreptions makes thick the predicate does or does not agree

and hypothetical. The framer of these simply with the neighbor-tag, "man is nearth," "this Bibb is not of human origin." The latter (it. Bibb is not of human origin." The latter (it. world is not extra the same origin. The latter (it. world is not the work of dunace, it much have her in intelliging hander; or with, an alternative-sg, "either manicular are capable of rising into "the contract of the contract of

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which make the assertion of agreement or disgreement sipply while others, which have some given to qualifying word uttached to the predicate of the prediction of the pred

with every branch of human knowledge.

Besides this, Propositions are also divided in Resident in Resi

other observation which must be made.

The classification of Propositions given above may he shown in a tabular form thus:—

A term is said to be distributed when it is taken in its whole extent-i.e., when it is used to stand for all the objects which it can signify; and sudistributed, if used only for a part of them. Hence from what has been said above, it will appear plain that the subject is distributed in all universal propositions, but never in singulars. In other words, the quantity of the proposition determines . the distribution of the subject. The distribution, however, of the predicate depends upon a different consideration. This is regulated not by the quantity but by the quality of the proposition.

A little reflection will make this clear. When we A little reflection will make this clear. say "all men are mortal," what we ure really doing is this-we are speaking of all the objects signified 175

by the term "man," and affirming of them that they ure mortal-4.c., that they belong to the class But in so doing we are not of mortal objects. dealing at all with the rest of the class of mortal beings besides man-e.g., birds and beasts; we are leaving them out of consideration altogether, and the proposition would be consily true whether or not there were any other mortal beings besides In other words, we are using the term mortal, the predicate of the proposition, in an undistributed sense; and this takes place in every affirmative proposition, whether universal or parti oular. In negatives, however, the case is other-wise. Let us take as an example, "no vice is useful." Hero we are really speaking of the whole class of objects to which the term "useful" is applicable, and denying that "vice" can he found amongst any of them, that any part of the predicate agrees with the subject. Hence the predicate is always distributed in a negative proposition, for the simple reason that if any part of that for which the predicate stands were to agree with the subject, and not disagree with it, the proposition would not be true. The result may be thus summed up. (1) All universals (and no partioulars) distribute the subject. (2) All negatives (and no affirmatives) distribute the predicate. With reference to their quantity and quality, taken togethen logicians are accustomed to denote every proposition by one of the four first vowels of the alphabet, as a symbol to represent it. Thus:—

Emphol. Universal discounties Transples (Control of Control of Con

Having thus given some account of the most important classifications of propestions, it will be more convenient to say a few words upon another subject (which dould not, purhaps, have been so readily understood at an earlier period), before proceeding to consider the different relations which propositions hear to one another.

We have already explained what is signified by universal terms; but the reader must also learn that there have, from the time of the earliest reatises upon Logio, been divided into five classes, called predicables, termed respectively "genus," "difference," "property," and "accident," "difference," "property," and "accident,"

A genus may be described as a universal term which contains under its signification that of two or more other universal terms. In this way "animal" in to be regarded as a genus, as comprehending under the idea for which it stands the ideas represented by the other universal terms "man," "beast," "bitd," etc. A species is a universal term which is contained under another more universal term—e.g., " usen " is a species of the geous " unimal," as forming a part

of what it comprehends. It is to be noticed that the same term was often be regarded as genus or species, according as it is smuidred with reference to the terms which it contains, or those under which it is contained. Thus "man" is a species of the more univer-al term "animal," but a genus when regarded as containing under it the less universal terms or species "negro," "widte unn." " European," "American," etc. A genus which is so coo honsive as in be contained under no other is called the kighest geams; and a species which, on the other hand, contains no species under it, but merely comprises undividuals, is called the largest species. All between these are known by the names of substitute govern or species.

A difference is the name given to the attribute which distinguishes a purificant speecks from all the other speeds which are included under the wave of the properties of the properties of the wave distinguishes. The speech "man" from the other speeds included under the pours "minush," and if we define "man" in a "stational animal," we have what he called a logical displation—La, one A property is the norm of on attribute found in

A property is the teams of our attribute found in all the inhishdanks of a species, and which, though not of the useence of the species, is necessarily plend to it—eag., "being unifacenced by motive," is a property of "inan," necessarily following from his being "rational." An accident is an uttribute which, though not

neconsarily joined in the difference, is yet found in same of the individuals of the specks. It may be inseparable—i.e., found in all the individuals of the observation of the specks in the individuals of the specks in the object of the specks in the same individuals of the specks—i.e., not universally found in the specks—i.e., not amongst all the individuals, are not in the same individuals at all times— e_F , "blackness" or "sleeping" in wea.

BRITISH COMMERCE.—III. (Continued from p. 40) BAW COTTON.

Thought the manofacturing of cotton fabrics is liktle more than a certary old in this country, this industry has grown to such dimensions that in 1897 the value of the raw cotton insported amounted to 22,250,00,00 the quantity being 10,00,000 cet. In 1790, over a bundred years priviously, the quantity insported was only 22,787 cet.

Of the total new urriving quite two-thirds come from the United States of America, the cotton-preducing States being Alabama, Georgia, Louisana, and South Carolina, and the principal ports whence it is shipped being Charleston, Mobile, Nor-Orleans, and Sammach. It comes neer in the form of rectangular bales, tightly pressed together by . by draube power, the weight of the belov varying from 150 lb, to 550 lb, 'This compact form facilitates handling and saves stowage. The American colton. besides coming over in the best form, is of the best quality, the fibres being long and strong—especially superior is that grown on the islands along the coast of Georgia. The cotton plant is cultivated in extensive fields, in which the seed is put into inlea considerable distance apart to give the plant room for development. In Ires than three is from the time of sowing the plants flower. Thereafter a capsule forms about the size of a wale and as soon as this begins to open, and before the wind can disperse its contents, the seeds, which are enveloped in down, are gathered and sent to mills to be separated from the down. The seeds are either kept for sowing or are used to make oil from. The down is the cotton, which is ultimately spur and weven into fabrics.

Another of the chief sources of our cotton apply is the British East Indies, whence we ved in 1897 375,000 cs.t., of the value of £636,000, the imports from the United States being 12,000,000 cwt., of the value of £21,000,000. A considerable impetes was given to the cultiantion of cotton in India through the American Clvn War of 1860. Our supplies of cotton from that country were, of course, stopped through the war, and we wure obliged to look to India te make good the deficiency, with the result that our imports from that country graw from just over a million and three-quarters over to five and a half million cwt. Indian cotton was then for inferior to American, the fibres being short and ill-ndapted for our muchinery, which was designed for the finer American long cotton. prices it commanded were of the highest. Even now, though it is largely grown from American seed, Indian cutton, taken all round, does not fetch the price of American. In commerce the several sorts of Indian cotton are known as Bengal, Bombay, Manilla, Madras, Sinm, and Surat.

From Egypt come large consignments of superior cotton, the quantity in 1897 being 2,400,000 cwt, the value 26,00,000. It is grown from the seed of American cotton, heece its quality. Algeria also produces cotton of a high class. Other cotton-yielding countries are Brazil, Chili, the Uoited

States of Colombia, Guayana, New Granada, Peru, and the West India Islands,

. The chief-sents of the cotton industry in this country are Manchester, Bury, and Oldham, and a very large proportion of our imports of raw cotton is landed at Liverpool. This, of course, is due to its proximity to the cotton-mills, and to its being our leading port for the Americas trade.

It was thought that the Manchester Ship Camil , would rob it of its predominance as a cotton port.

The source of our jute supply is India Of the, total imported in 1897, viz., 336,000 tons, valued at £4,000,000, Bengal sent almost the whole amount. The centre of the jute manufacture is Dundee, and to that port consequently went the larger proportion of jute imported, Loudon and Liverpool dividing the remainder.

The jnte plant grows from 12 ft. to 14 ft. high, and the fibre which is contained in the bark runs to lengths of 8 ft. It is made into coarse canvas and guany bags mostly, but on account of its fine lustre it is also mixed with silks to produce the ohenper sorts. It readily lends itself to adulteration, as it always improves the appearance of what-It does so, however fabric it may be woven into. ever, at the expense of the durability of the fabric. Though it easily rots from moisture, and is therefore unsuited for articles much exposed to the weather, or in which the quality of strength is required, such as ropes, it yet finds its way into these urticles, the temptation to improve the appearance of their fabrics and so impose upon the unwary being too great for some manufacturers to withstand. A genuino homp rope, for instance, costing £32 a ton, would be cast aside by anyone not an expert for a rope made of jute and not worth half the monoy.

The chief uses that hemp is put to are the manufacture of sall-cloth, cordage, sacking, and fabrics requiring strength. A coarse brown paper is also made from it, and oakum (with which the inmates of our prisons make a reinctant acquaintance) is simply tarry hemp, got by natwisting worn-out ships ropes. When teased out, it is ugain ased in ships for stopping leaks and for caulking.

Oar chief supplies of this fibre come from the dlipping Islands, whence in 1897 we imported Philippine Islands, 44,000 tons, valued at £759,000. Other sources are Germany, from which came 8,400 tons, at £200,000; Russin, 7,400 tons, at £170,000; Italy, 230,000; anssin, 7,400 tons, at £17,000; Italy, 15,000 tons, at £400,000; and othe countries, 6,500 tons, at £100,000. The total amounted to 39,000 tons, at £1,760,000. The Italian, the price t.

of which may be observed the higher than that of the lemp produced in other countries, is raised by spade culture, and is of a high degree excellence, being known as "Italian garden hemp." The ports that receive the largest consignments

are London, Liverpool, Hull, and Leith.

The hemp plant is native to Persia and the northern parts of India. From these countries it has been introduced into Europe. It grows as high as ten foot, and is a hardy plant of the nettle tribe. It thrives in almost any clime. Though the use of this plant as a constituent of textile fabrics was not known to the ancients, its seed provided them with an intoxicant. In hot countries the plant, at the expense of the fibre, "becomes powerfully aurcotic, and its leaves, flowers, and stem become covered with a peculiar resinous scoretion called charras in By the Arabs this resin is called hashash, and during the Crusudes, men intoxicated purposely with it, called 'hashasheens,' used to rush into the camp of the Christians to murder and destroy, whence our word ussassin is derived. Hemp is employed in other forms besides churrus as a narcotic. The whole herb, resinous exudation in-cluded, is dried and smoked under the name of gunyak, or bhang when the larger leaves and cap-

sules only are employed. The Hindoos and the Bushmen of Southern Africa smoke these preparations la rude pipes, as we do oigars and tobacco. These pipes are about three inohes in length, and are usually made out of the tusks or canine teeth of some animal, perforated through, leaving only the (John Yeats, "Natural History of Comename) " merce.") , Of flax the great producer is Russia. Out of a total import in 1897 of 98,000 tons (dressed.

undressed, and tow), worth £3,000,000, she sent us 73,000 tons, worth £1,990,000. After Russin the grentest quantity was sent by Belgium, viz., 20,000 tons, at £1,000,000. The leading ports at which flax is landed are,

first and foremost, Dundee, followed by Belfast, Leith, London, and Liverpool. The flax plant will grow anywhere almost, and at

one time it was extensively cultivated in England. Even yet it is largely produced la Ireland. It is sown broadcast in fields, like ordinary cereals, and after flowering is pulled up by the roots. It is then exposed to the sun and to inoisture to destroy the onter covering and so set free the tough fibres within. Having been subjected to other processes for separating these fibres, it is backled-in other words, combed-and then bleached. For the finest linens the hockling is repeated through finer and finer combs. It is from the heekling process that tow comes, which may so far be compared to the combings that result from the dressing of the human hair. The use of flax sibre for human clothing dates from the earliest times, and microscopic inspection of the wrappings round Egyptian nummings shows them to be made of this substance.

WOOT.

In commerce the term wool comprises the hair of the alpace, vicuin, alman, and other animals. It is only a very small proportion, however, of the total import of this product that does not coné from the fleece of the sheep, and of this latter, again, it is a small proportion that does not come from Histish possessious. The total import of sheep's, wool in 1837 was 700,000,000 lb, valued at £23,000,000 which exceeds by more than a million stelling the value of the wheat imports of the same year. Of this total 608,000,000 lb, came from British possessions—notably from New South Wales.

Victoria, Now Zealand, British possessions in South Africa, Queensland, and the British East Indies.

The vast export trade in Australian wool began in 1807, when the modest quantity of 245 lb. was shipped to England.

A good idea of the varied uses of this commodity may be gathered from the following passage:-"Wools are divided into two great classes-clothing wools and combing wools, or short wools and long wools : and the fabries woven from them are termed woollens or worsteds, according as the one or the other is employed. The fibres of olothing wools felt or interlace, forming thereby a denso and compact material, suitable for warm and heavy clothing, when manufactured into broad cloths, narrow cloths, felt for hats, blankets, serges, flannels, and tartans. Combing wools, on the contrary, though long in fibre, do not felt, and are therefore employed in the manufacture of light and loose, but still warm, garments, such as stuffs, bombazines, merinoes, hosiery, camlets, and shawls, and various mixed goods, as damasks, plushes, and velvets." (John Yeats, "Natural History of Commerce.")

BRISTLES.

After wool and slik the most important of the animal fibres is the bristle of the pig. It is used in the manufacture of the superior kind of brushes, such as hart, oldot, tooth, shaving, and null brushes. The bristles enjoying the highest repute come from Franco, whiches produced and prepared there, or Franco, whiches produced and prepared there, or soft as the halt of an infant. They are used to make shaving-brushes from and even artists' brushes, and the penoils of the painter and decorator Another high class of selected bristles goes to the shoemaker. These require to be of a certain length and firmness, and fetch various prices, according to quality.

Our total simports of bristles for each purposes as those mentioned, in 1807 amounted to 4,000,000 lb, valued at £214,000. The orbit countries sarphyling as were Germany, Ranko, China, British Bast Indies, Hong Kong, and Franco. Belgium, Holland, the United States of America, and East India also contributed to our significe.

For a long time the great bristle-producing country was Russia, whence our imports in one year have exceeded three millions sterling. In that country heads of sent-will swine roamed the forests, strown as they were with course, approaches to the value of the wild bong the perfect of the wild bong, the better is the quality of the bristles it yields. Ply broeding with a view to enlancing the delayed of the fields, the quality of the bristles is yields of the production of the product of the produc

They come over tied in bundles and carefully packed in casks. They are sorted according to colour, elasticity, firmness, and length, . The expert distributes them into three classes-brown, dark, and white. The elasticity he determines by a brush across the back of his hand. As to the longth the standard is six inches, those longer than that being uspally deficient in strength, and those shorter being, of course, less adupted for working up into the finished article. The high price of bristles has had the effect of bringing forward many substitutes, and with these bristle brushes have often been adulterated. On the whole, however, these substitutes have proved beneficial, and brushes are tobe found now in every household. This could not have been the case had we been confined to bristles and the more costly animal fibres for the material. Vegetable fibres, such as Mexican fibre made from the Istle plant, though their use in brush-making is quite recent, have put it within the power of the poorest housewife to have a scrubbing brush, and o have promoted eleanliness and, as a consequence. wholesomeness just as effectually in their own way as sanitary laws and more elaborate methods of combating one of the necessary evils that accompany industrial progress. Thus does the enterprise of the merchant in scarch of private gain often work for the general weal in an indirect way, as surely as the public-spirited logislator. For further information respecting fibres the reader is referred to the lessons on Commercial Botany, Vol. IV., pp.

DYD-STUPPS.

Of dye-stuffs imported the highest value is reached by Indigo, vis., £1,£21,809 for \$1,854 cwt. Of this total £1,85,603 worth, representing 76,869 cwt., come from British possessions, notably Bengal and Madras. Among forigin countries the chief sup-

piler to Central America.

The indigo jiman is a native of India, whence is was first futerbased to Europe in the seventeenth contrary. The use of indige next with considerable opposition, and have were passed even in England Ogy in Reseased the entitlement of the word. It is applied to the dyning of cottons, lineas, sitis, and woodless, and every westerwords known for the conduction of
special tracegous servine.

The property of th

COCHINEAL.

The total annual import of this valuable dya, which originally came from Mexico, amounts to 7,808 ovt., valued at £51,007. Of this 7,540 ovt., of the value of £50,034, are sent from the Canary Islands. Coolineal is used ohieldy for dyeing wootlens a scarlet colour, and provides brilliant

yeds, such as cormino.

It is made from an insect so small that 70,000 of these tiny orientees are compared to be required from which they are competed to be required from which they are competed into lags. They are then plunged into boiling water, threely being silled, and afterwards dried in the sum or in some silled, and afterwards dried in the sum or in some. This process produces "black cockinest." When, populars later, and po Iy the term "alvey cockinest."

After being dried, the cochineal is sifted from particles of the plants that may have become mixed with it. It is then packed in bags of about 150 lb. each, in which form it reaches the market.

From an acre of nopal—the species of cactas specially cultivated for the production of cochineal —the yield of dry cochineal is estimated at 250 lb. OUTGH AND GARNIER.

Outch, also called estechu, and gambier, or gambir, are alike in their obsenical composition, and are devoted to similar uses in the arts of the

tanner and dyer.

Of the total imports of these jungle products

-viz. 25,000 tons, of the value of £400,000—a
very large proportion comes from the Straits
Settlements, Burmah sending the next larges

emailty. Chiefe is a settined obtained chiefey from two Chiefe is an extense obtained chiefey from two courses. Formerly both it not guasilest were neground to be an earth, and were known in common to common the common to common the common to common the common terms of the common terms

power as a seven or eight pounds of onk bark.

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Gaushier, kowen, in pharmout a pulle catedon,
White a second of the catedon of

VALONIA.

This is also a dycing and tanning material, and is shipped mainly from Turkey. Our total imports are 23,000 tons, of the value of 250,000, and of this, Turkey isonds us a very large share. It is the commercial term for the accors output of aspecies of oak—Quereux engineer. Towards the end of July and the beginning of August the fruit.

ripens, and is beaten from the trees. After being gathered, the acorn cups are dried, and then o voyed to the port of shipment, there undergoing in the warehouses a further process of desiccation and partial fermentation. At this stage the acorns drop out of the cups; the whole is then picked over, the cups being separated from the acorns, and the good oups from the bad.

Though the tree from which these cups are prooured is an insignificant shrab, yet the oups them-selves attain a diameter of nearly 2 inches. They are injured by main, which robs them of their tannin, and darkens their colour, and to rain they are frequently exposed. Large quantities of them are irequently exposed. Large quantities or more also damaged in the warehouse while preparing for shipment. The expert, however, easily indiges the quality of a consignment from its bright colour, the size, and general appearance of the cup. The acom itself is used to feed pigs on.

Besides Turkey, Greece also has extensive forests of the valonin-yislding oak. In that country the bast quality is guthered in April, while the acorn is still immature, the second quality being collected in September, and a much inferior in October. The crops are hable to a disease, the cause of which is not yot known, which renders the caps useless for industrial purposes, and seems to provail in seasons when the yield is specially large. Valonin is generally used in conjunction with oak-bark or myrohalans, and in the production of hard and heavy lenther.

SUMACII. Sumach, or sumac, comes mainly from Italy and

Sioily, thus country sanding very nearly the whole of the amount imported. It too is used in tanning uppers as well as dyoing, giving a bright Jellow colonr to ttons. It is prepared for the market by pulverising the loves and stoms of Thus coriaria n plant that rises to the helelit of about 8

The plants, though they grow wild in several countries, are yet subjected to cultivation, especially in Sicily, and may be reared from seed or from shoots. The leaves are gathered at different season In different countries, and according to the state of the plant, and the purposes for which the leaf is intended, and allowed to dry either in the field or in the barn. They are then threshed with the fiail to separate them from the branches and stems, the product being "sumach for grinding" or "sumach for baling," according to whether the leaves have been broken up or come from the stems entire. They are then ground in mills, and screened; the final operation being to pack them in bags, each containing 11, cwt.

Though the sumac from America contains more tannic acid than the Enropean, yet the latter is preferred by tanners and dyers, as it lends itself better to the production of the finer white fancy leathers used for gloves and shoes. The tanning properties of summo resemble those of the myrobalan, though of a paler colour, and it is used mostly in tanning morocco and such fancy leathers.

LOGWOOD.

This useful wood comes to us dhiefly from the British West India Islands and British Honduras. the former sending by far the larger amount. It is astringent, its taste is somewhat sweet, and its follow something like that of violets. It arrives here in the form of logs, and is so hard that it sinks in water. The logs are out up and ground into a powder, in which form it s to the dyer. Boiled in water logwood yields a blood-red colour to the water, which a little acetic neid renders bright red. This is the method of making red ink, alum being added to make the colour permanent. In dyoing it is used oldefly for yielding red, bine, and black, various shades being obtainable from it under different processes of

troatmont. The history of this wood is intoresting, as may be seen from the following extract:-"Logsoems to have been first brought to England soon after the accession of Queen Elizabeth; but the various and beautiful colours dyed from it proved so fugacious that a general outory against its use was soon raised; and an Act of Parliament was sed in the twenty-third your of her rolen which prohibited its use as a dye under severe penalties, and not only authorised, but directed the burning of it, in whatever hands it might be found within the roulm; and, though this wood was afterwards sometimes clandestinely used under the folgaed name of blackwood, it continued subject to this provision for nearly 100 years, or until the passing of the Acts 13 & 14 Charles II., the prenmble of which doolares that the ingenious industry of modern times both taught the dyers of Eagland the art of fixing colours made of logwood, alian blackwood, so as that, by experience, they are found as lasting as the colours made with any other sort of dyeing wood whatever."

MYROBALANS.

Another product that enters into both the tanner's and the dyer's art is the Myrobalan. This is a large unt, the fruit of Torminalia chebula and Terminalia bellerica, small trees native to British-India. The quantity imported amounts to a very considerable number of cwt., Bombay and

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Scinde being the two great contributors to this trade.

Constituted with alum insyndralans yield a durable yellow colour, and, nixed with sulphate of two yellow colour, and, nixed with sulphate of two yellow colour, and, nixed with sulphate of two numble part, while from the kernel is compressed an oil need to strengthen the lair. In calier printing, investbalans are employed to produce a durable black dye. They are imported in bags containing from I own, tol Jews.

GREEK.-XX.

[Continued free p. 49.]
PARADIGMS OF MUTE VERBS (continued).
(2) VERBS WROED CHARACTERISTIC IS A \$-80UND (8. 9. X).

Purity characteristics, α , γ , χ ; impure characteristics in the present and imperfect, $\tau\tau$ (see), more rarely ζ .

Active. Middle. Active. Middle.
Pres. nhiero, I nhieroppe. nivro, I threoppe.
knit - set in

οτέεν Ροτί. πέ πλεχ-α πέ πλεγ-μαι. τέ πεχα τέ παγ-μαι. ταξω πλέμ (πλέκ-πλέξαμαι. τάξω τέξομαι. σω)

Aor. 4-Ada d-Markopp. d-valdopp. 3 Fut. we-skiftyon. v-videpon. 1 Aor. 4-mArg.-dyv. d-videpon. 2 Fut. mary-bloomen. v-videpon.

2 Λοτ. δ-πλάκ-ης. δ-τάγ-ης. 2 Fut, πλακ-ήσομαι. τογ-ήσομαι. Τοτbal sidj. πλεκτός, πλεκτόος; τοκτός, τοκτόος.

*Norabulany.

*Auspris, -ss, 5, 2 sin.

*Aus

'Arsystru (char. 7), I dig Aise, very, very mach.
up.
'Arsystru (char. 7), hand; wid. I deelre.
'Arsystru (deinn. 7), hand; wid. I deelre.
'Arsystru, vers. 4, youth.
'Arsystru, I arrange.
'Arsystru, vers. 4, youth.

Grμοτοκλής, -(est, d, mislead, Thornistocles. Πεθγτείω, I am poor Βετακλήττω (char. γ), I (πένης). striko dova, astound, Τερέντω (char. γ), I dis-

frighten (2 nor. pass. aerswhdyrs, 2 fut. pass. haveswhdyrsoan). Keraph éya', I burn down. Keraph éya', I burn down. Kefal, I cond, cry out. + twadrse (blanzy), I guard. Exencise 105. Translate into English :—

1. We refuller refunction impliges. 2. Al openior region for the region of the first and earlier. So Quanteraction, 1944. Algorithm, 6 weeks beingered that risk to refuse the temperature of the refunction of th

EXERCISE 106.

Tamustate into Greek:—
1. The lowterine were pursued by the Greeke,
2. The lawterines fived into the city. 8. The enemy
bernt down file oity. 4. Those enemy, 5. You care for business, 6. Carling for wur mid
business, then not troubled. 7. Many fine deeds
were done by the Greeke. 8. The women, frightened
by the enemy, shrinked.

(3) VERBS WHOSE CHARACTERISTIC IS A 1-SOUND
(5, 7, 5).

Pure characteristic, 7, 3, 0; impure characteristic in the present and imperfect, 6 more soldon ss.

Actica. Middle.

Actica. Middle.

Actica. Siddle.

psd.-s. spd.cs. spd.cs. spd.cs.

 Pres.
 πεθες
 J πεθεσμαι.
 φράζωμαι.

 jernado
 I mako
 knorn

 1 Parl.
 πέπεινης
 πέπρεισιας
 πέφρειση πέφρεισμαι.

Passire.

I Aut. & mela-three.

I Fut. mela-threeps. ppss-throuns.

Pashel dell mental transfer.

I Fut. wee-bisquat. open-bisquat.
Ferbal Adj. neurlor; open-bisquat.
Vooantulany.

**Zpapierava, I miss the "Eggalier, us. 4, youth, more's, crea, the for delay, if I. "Aprélier, 1 rob., plumder. "Aries, -arie, Aries, -arie, Aries, -arie, Aries, -arie, Aries, -arie, Aries, -arie, Aries, -arie, -aries, -a

(out encowiem).

"Er, yot; fri 3d, further. "On Bes. -ou, 5, riches, Edgeaden, -ns, 4, joy. prosperity, happiness. gladness.

'Oπάζω, I cause to follow,

cold. Παύω, I cause to ecase. Σκαδάζω, I scatter. Σπανίζω, I make rare, I I free from; mid. I am rare.

cease. Πείθω (with acc.) I persuade, convince; perf.

Στρέφω, I turn back. Συναρμόζω, I put together, fit, accommodate.

mid. I trust, I yield myself. Φρά(ω, I declare, speak. Πληγή, ·fis, ή, a stroke.

EXERCISE 107.

Translate into English :-

 Παῦσον με, ὁ φίλε, πόνων, σκέδασον δὲ μερίμνας, στέψον δὲ αδθις εἰς εὐφροσύνας. 2. Μιθριδάτης 'Ασίαν ήρπακεν. 3. Λογίσου πρό έργου. 4. Οἱ θεοὶ τοῖς θνητοῖς ύλβον Επασαν. 5. 'Ο Θεὸς Επαντα συνήρμοκεν. 6. "Ην σύ κακῶς δικάσης, σὲ Θεὸς μετέπειτα δικάσει. 7. Έν τοῖς Δράκοντος νόμοις μία ἄπασιν ώριστο τοῖς ἁμαρτάνουσι ζημία, θάνατος. 8. Τπέρ σεαυτοῦ μη φράσης έγκώμια. 9. Οἱ τῶν Ἑλλήνων ἔφηβοι εἰθίσθησαν Φέρειν λίμου τε και δίψος και δίγος, έτι δὲ πληγάς και πόνους XXXaue

EXERCISE 108.

Translate into Greek:-

1. Cares are scattered. 2. Cares will be scattered. Happiness is bestowed by the gods on mortals. Draco appointed one punishment, (namely) death, for all sins. 5. We shall always admire the Athenians. 6. The Athenians have been always admired. 7. The Greeks accustomed their youth to bear all labours. S. Socrates was admired on account of his wisdom. 9. The song has scattered all our cares.

LIQUID VERBS.

THE FORMATION OF THE TENSES OF LIQUID TERRS.

Liquid verbs are those whose characteristic is a liquid-namely, A. µ, v, or p. Liquid verbs form the future active and middle and the first agrist active and middle without the tense-characteristic o. and yet take the tense-characteristic s in the first perfect and pluperfeet active, as :-

σφάλλω (pure stem ΣΦΑΛ-), I trip up, stumble: σφάλλω, fut. σφαλ-ώ, 1 nor. έ-σφηλ-α, perf. έ-σφαλ-κα.

The future-terminations of liquid verbs, -&, -objan (from -έσω, -έσομαι), are circumflexed like the present active and middle of contracted verbs in -em, as φιλ-ώ, φιλ-ούμαι. Liquid verbs have not the third future.

With few exceptions, the present of those verbs whose stem-vowel is short has undergone a strengthening of the pure stem, which strengthening consists in either the doubling of the A or the insertion

'Piyos, -ous, τό, stiffness, ' of the liquid v after the characteristic, as :- σφάλλω, stem ΣΦΑΛ-, present σφάλλω, the λ being doubled: τέμν-ω, pure stem TEM-, ν being introduced to form the present. Or in this, that the root-vowel is either lengthened (namely, 7 is lengthened into 7 and " into v, as all verbs in -iνω, -vνω): for example. nplrw. I judge; àuivw, I ward off; σύρω, I draw out, pure stems, KPIN- (1), AMYN- (5), ETP- (6); or the vowel is changed into a diphthong (that is, a into a. 'ε into ει): for example, φαίν-ω, I show; κτείν-ω, I kill; pure stems. ΦΑΝ-, ΚΤΕΝ-. Μέν-ω, I remain, and véu-w. I divide, retain the form of the pure stom. . For example :---

PURE STEWS.	PRESENTS.	ALTERATION,
ΣΦΑΛ	σφάλ-λ-ω.	λ doubled.
TEM	τέμ-ν-ω.	v introduced.
KPIN	κρίν-ω.	i lengthened.
'AMTN	αμύν-ω.	Flengthened.
MTP	σύρ-ω.	f lengthened.
ΦAN	Φα-ί-ν-ω.	a changed into a
KTEN.	wre-l-ven	e changed into e

The strengthened (impure) stems thus formed remain only in the present and the imperfect; the other tenses are formed from the pure stem, the short vowel being lengthened by the change of ; into I. v into v. a into v. e into e. in the first agristactive and middle: thus-

PURE STEM. PRESENT. PUTURE. 'I AGR., ACT. I AGR. MID. ΣΦΑΛ-, σφάλλω, σφαλώ, ξ-σφηλ-α, ξ-σφηλ-άμην.

The first perfect active is f-odux-ra, and the second norist passive is e-gody-nr. The future activo always bears a circumflex accent (στελώ). and the future middle ends in -ovucu.

Liquid verbs with monosyllabio stems and the stem-vowel e take the conversion a in the second norist, in the first perfect and pluperfect active, the perfect and pluperfect middle or passive, in the first aorist, first and second future passive, as well as in the verbal adjective; and the conversion o in the second perfect and pluperfect; as in στέλλω, I send:-

στέλλ-ω, fut. στελ-ώ, 1 perf. act. έ-σταλ-κα, perf. mid. or pass. E-oval-uar. 1 nor. pass. E-oval-onv . (poet.) 2. aor. pass. ¿-στάλ-ην, verbal adj. στάλ-τέος.

φθείρ-ω, fnt. φθερ-ώ. 1 perf. act. έ-φθαρ-κα, perf. mid. or pass. έ-φθαρ-μαι. 2 nor. pass. έ-φθάρ-ην... verbal adi. φθαρ-τός, but 2 perf. έ-φθορ-α.

Verbs of more than one syllable are not capable of conversion, as :- αγγέλλω. Ι απποκπον, ήγγελκα, ήγγελμαι, ήγγελθην.

The following verbs lengthen the short vowel of the stem irregularly, those in -arm changing a not GREEK.

unto n but a. as:-igyraitu. I make lean, Texrare. is xravat: кербаlvw. I gain. екербага. кербагат: конhalve, I hallar, enoihāva, nothāras; hevnaire, I make white ; donairo, I make angry : nezairo. I make ripe ; ulso by all in spaire, as - repaire, I finish fut, repare. nor. emepara, inf. meparas; and by all in -saire, as :zialow. I make fat, čzlava, ziavai (except malow. I spot. μιήται). Also αίρω, I take. and άλλομαι, I leap, belong here-ήρα, άραι, ήλάμην, άλασθαι.

The first perfect active of verbs with the characteristic r must end in -yea, as µe-µíay-ea (from µaíve), instead of µe-µlav-κα. This form, however, is found only among the later writers. There are also other forms, as :- κερδαίνω, I gain. perf. κεκέρδακα; μένω, I remain, μεμένηκα, from MENEΩ. Many verbs have no perfect. Also, the verbs with a for their characteristic form the perfect from a theme in -c. as réu-w, I divide. veréunea, as from NEMEO.

The three verbs following, with v for their characteristic, eject the p not only in the perfect and pluperfect active, but also in the perfect and pluperfect middle or passive, in the first norist passive, and in the verbal adjective :-

roivo, I separate néroira κέκρζμαι ≷κρίθην. Khirw, I hend nésklina κέκλζησι Zua (Ann : πλύνω. Ι τοαελ πέπλϋκα **πέπλ**ύμαι ₹πλύθην.

Respecting the formation of the perfect middle or rassive, observe the following :-When \$\sigma \text{would follow a liquid, the \$\sigma\$ is thrown

ουτ. ος ήγγελσθαι, ήγγελθαι; εο πεφάνθαι.

In verbs in -are and -ore, the r before the termination beginning with a commonly disappears, and a o is introduced to strengthen the syllable, as φαίν-ω. πέφα-σ-μαι, πεφά-σ-μεθα; but in some verbs of this kind the vassimilates itself to the following μ, πε παροξύνω, I sharpen, excite, παρώξυμ-μαι, inf. παρωξύν-θαι; alσχύνω. I cause shame, ήσχυμ-μαι, inf. ¢σχθη-θαι.

In the second perfect (which, however, is formed by only a few verbs) the short stem-vowel is lengthened before the termination -a, as in the first agrist active, except verbs having e in the future, which take the conversion o, as :- φαίν-ω, 1 aor. έ-φην-α, 2 perf. πέ-φην-α.

PARADIGM OF LIQUID VERBS.

We now give a short paradigm of the liquid verbs, arranged according to the stem-vowels of the future.

(1) With a in the Future.

φαίνω. I show, paes. φαίνομαι; I appear; fut. act. φανῶ, fat. mid. φαν-οῦμαι. I shall shine; 2 perf. act. πέ-φην-α, I shine forth ; 1 nor. act. έ-φην-α, I nor. mid. έ-φην-άμην; ἀπεφηνάμην, I declare.

INPUTCTIONS OF THE PERFECT ASSESSED. ISD. Sing. wi-cas-um. IMPERAT Sing. (re-car-go) πέ-φαι-σαι. Te-dés-fa. mé-oar-rai. In cl Ti-bar-for. Dual. :: f-par-lor. τε-φάι-θων. -f-car-for. Plur. né-pas-ée. Plier. we-dag-uela. πε-φάν-θωσαν πέ-φαν-θε. or ne-ody-

~e-φασ-μένοι θων. eloi(v). INFINITIVE. we-pair-Bas. PARTICIPLE, xe-pas-µéros.

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(2) With e in the Future.

στέλλ-ω, I send.

Middle. Acticc. Passire. Pres. στέλλ-ω. στέλλ-ομαι. 1 Aor. έ-στάλ-θην. 1 Perf. έ-σταλ-κα. έ-σταλ-μαι. 1 Fut. σταλ-θήσομαι. Fut. στελ-ω. στελ-οθμαι. 2 Aor. ₹-στάλ-ην. 1 Λοτ. ε-στειλ-α. ε-στειλ-άμην. 2 Fut. στάλ-ήσομαι.

Verb. Adj. σταλ-τός, σταλ-τέος.

(3) With I and & in the Future. (a) τίλλ-ω, I pluck; σύρ-ω, I pull.

τίλλ-ω.	$\sigma b \rho - \omega$.
τίλλ-ομαι.	σύρ-ομαι.
τέ-τιλ-κα. ·	σέ-συρ-κα.
τέ-τιλ-μαι.	σέ-συρ-μαι
τίλ-ῶ.	συρ-δ.
τίλ-οθμαι.	σύρ-οθμαι.
Ε-τίλ-α	ξ-σύρ-α.
ζ-τιλ-άμην.	∛-σῦρ-άμην.
è-τίλ-θην.	∛-σύρ-θην.
	τίλλ-ομαι. τέ-τιλ-κα. τέ-τιλ-μαι. τίλ-ῶ. τίλ-ῶμαι. ἔ-τίλ-α ἐ-τίλ-άμην.

τιλ-θήσρμαι. συρ-θήσομαι. 2 Aor, and 2 Fut. Pass. ε-σύρ-ην. συρ-ήσομαι. Terb. aldj. TIX-TOS, TIX-TEOS; GUP-TOS, GUP-TEOS.

(b) κλίν-ω, I bend; the ν drops,

	Active.	Middle.	Passire.
	KXEP-W.	κλίν-ομαι.	 Aor. ἐ-κλί-θην.
erf.	ĸ€-ĸλĭ-ĸa.	κέ-κλί-μαι.	 Aor. ἐ-κλίν-ην.
ut.	κλίν-ŵ.	κλίν-οθμαι.	1 Fut. all-through.
Aor.	€- KAIV-a.	δ-κλίν-άμην.	2 Fut. allv-hoopai.

Verb. Adj. KAL-TOS, KAL-TEOS.

The inflections of the perfect middle or passive κέ-κλι-μαι follow βε-βούλ ευ-μαι.

VOCABULARY.

1 Future Pass.

F

'Αδύνατος,	-ov,	impos-	'Εκφαίνω, I bring to light,
`sible.			show, display.
**	T 1-111		Planta L. I drive furo-

perly used of a ship? Abinous, -ews, h, increase, prosperity. from the right way, Γυΐα. -αs, ή, a field. mislend (from oreaka. Διαφθείρω, I destroy, I lay I drive ashore).

waste.

naufrägus), a ship-

Hapasofers, unexpectedly

a city in Macedonia.

Hepalyw, I accomplish.

Πλήττω, I strike, wound.

Πολιορκία, -αι, ή, a siege.

Σπουδάζω, I make haste.

Στάδιον, -ου, τό, a measure

feet), a race-course.

Tolevua, -aros, ro, an

of length (about 600

I am in earnest.

Taipos. -ov, 8, a bull.

wrecked person.

Oiκτείρω, I pity.

Kepbaira, I gain, carn, derive advantage (Répôos). αρυπτός, -ή, -όν, hidden;

τὸ κουπτόν, the hidden Miniew, I spot or stain.

(our parador). thing, mystery, secret. Suciow, I sow. Σφάλλω. I trip up, throw Naunyos, -of. 6 (in Latin down.

EXERCISE 109.

Translate into English:-1. Κρίται φίλους οὐ ράδιου. 2. 'Ο πλούτος πολλάκις

εξώκειλε του πεκτημένου είς ετέρου ήθος.. 3. 'Ο άγγελος έπηγγειλε την νίκην. 4. Οἱ πολέμιοι την χώραν διέφθειραν, Ε, Ναυηγούς οἵκτειρον, ἐπεὶ πλοῦς ἐστὶν ἄδηλος. 6. "Ην αποκτείνης έχθρόν σου, χείρα μιανείς. 7. Έγω μέν σπερώ τὰς γυίας; ὁ δὲ Θεὸς αξέησιν παρέξει. 8. Τὰ κρυπτά μη ἐκφήνης φίλου. 9. Φύσιν πονηράν μετάβαλείν οὐ ράδιον. 10. Ἡ τύχη πολλάκις τοὺς μέγα φρονούντας παραδόξως ξυφηλεν.

Exercise 110.

Translate into Greck :-

1. The boys spot their hands. 2. It is not possible to judge friends. 3. Many persons have been corrupted by luxury. 4. The victory was announced by the messengers. 5, Good men will pity the poor. 6. By thy skill thou hast made much gain. 7. Friends will not declare the secrets of friends. 8. The citizens sow the fields,

VOCABULARY.

"Αθλητής, -ού, δ, an Μεθώνη, -ης, ή, Methoné, athlete or combatant or competitor. Mixar, -wros, & Milo. Aloxoro. I shame ; 1 aor. "Opagis, -ews, n. sight. Παροξύνω, I encourage.

pass, I am ashamed. Aμύνω, I ward off, avoid, avenge myself. *Anopaire, I show, declare.

Alagnelow, I scatter abroad (in Latin dis-. semino). "Ηττα, ·ης, ή. a defeat. Κοινός, -ή, -όν, com-

mon.

Κρότων, -ωνος, δ, Croton. STROW EXERCISE 111. Translate into English :--

1. Οἱ στρατιώται ὑπὸ τοῦ στρατηγοῦ eἰs τὴν μάχην παρωξύνθησαν. 2. Φίλιππος έν τῆ πολιορκία τῆς Μεθάνης els τον όφθαλμον πληγείς τοξεύματι διεφθάρη την δρασιν. 3. Σοφίας ο κάρπος οδποτε φθαρήσεται. 4. Αἰσχυνθείην αν, εί φανείην μάλλον φραντίζειν της δυαυτού δόξης ή της κοινής σωτηρίας. Β. Μίλων, δ έκ Κρότωνος άθλητής. ταθρον αράμετος έφερε διά του σταδίου μέσου. G. Eis την πόλιν διέσπαρτο δ λόγος τολς πολεμίους νικηθήναι. 7. Οι πολίται τους πολεμίους περί της ήττης άμυνεθνται. EXPROSE 112.

1. The general encouraged the soldiers to the fight. 2. The generals encourage the soldiers. 3. The citizens avenge themselves on the enemy for their defeat. 4. If thou art in carnest, thou wilt readily accomplish all things. 5. All things have been accomplished by him because he was in earnest. 6. The scattered foes will appear again. 7. A good citizen cares more for the public good than for his own. 8. By the victory all the citizens were gladdened. 9. The city has been destroyed by the enemy.

ETYMOLOGICAL VOCABULARY,

One of the chief excellengies of the Greek language is the facility of combination which exists among its elements. One word may form the basis of a score, nay, of a hundred words. This fact may be illustrated in the word ravny's, which we had in the last vocabulary but one. The word is composed of two terms-vaus, a ship, and ayvous, I break: and the compound ravayia, which we render shipwreck, is literally ship-break, exactly agreeing with the German sehiffbruch.

Let us, in order to illustrate the power of combination in Greek, give the derivations from pass :--

NATE, a ship. Hence-Navayée. I suffer shipwreck (dyvous, I break). Navāyia, a shipwreck.

Naudwor, a wreck. Napavés, a wrocked person.

Navaoyee, I. command a ship (doxh, command). Navapxia, command of a ship.

Ναυαρχίς, -- ίδος, ή, tho admiral's ship. Nasapyes, the commander

of a fleet. Naußarns, a ship's

passenger (Balva, I go). Nαυκληρέω, 1 possess a ship, I carry on a trade in ships (κλήρος, a lot, inheritance, property).

Nauxληρία, the profession of a ship-merchant.

Ναύκληρος, a shipmerchant.

Navκρατέω, I conquer in a ship, a sea-fight (modros, strength). Naukourns, a conqueror

by sea. Ναυκρατία, supremacy on the sea. Ναῦλον, fare payable on

a sea-voyage. Naukoxew, I am in port (Adxes, a station), pre-

paring for sea. Navloxía, being in port, harbour, or dock. Naukógior, a harbour.

Naulde, I hiro out ships. Nαυμαχέω, I fight on shipboard (udyn, battle). Navuaynoelw, I desire to fight on sea.

Nαυμαχία, α sea-fight.

GREEK. 107

National one who fights Navoroknua, senfaring, by sea. Narmyés, I build a ship

(merrous, I put together). Navanyia, ship-build-

ing. Ναυπηγύε, a shipwright. Navaia, ship-sickness-

that is, sen-sickness (nar nausca). NavaiBios, living by shipming (Blos, life).

Nauguelerds, distinguished by ships (A Leirós, distinguished).

Ναυσίπορος. (Latin, navis and ago). Navoroxée. I send by ship

Nedotokos one who ships goods.

Navyns, a shipper, a sailor. Navrikos, relating to a sailor (our noutical).

Naurikos, a little sailor (our nautilus).

Naupayos, ship-destroying (odyw. I eat). Naudeopla, loss of ship (φθείςω, I destroy).

protected Ναύφραντος. by ships (opdore, I hedge in). Navovlania, I guard

navigable n ship (φυλάττω, Ι guard). (στέλλω, I send).

Here we have some forty words, all of which have for their primary root the word vans, a ship. It would be easy to augment the number, for we have given only the more important words. The student should carefully mark the secondary comrounds, and notice how each one in combination with page forms a new set of words. Each of these secondary compounds (άγνυμι, άρχή, βαίνω, etc.) he should trace out in the combinations which they sew rally form with other words. If this plan were followed out analytically and synthetically, he would find that the immense vocabulary of the Greek language could be classified and arranged under a number of roots so small as to be easily learnt.

DEVIATIONS

SPECIAL PECULIABITIES IN THE FORMATION OF SOME VERDS, BOTH PURE AND IMPURE-STRENGTHENED STEMS.

· Very many active verbs form the future with the middle form, as :- asobo. I hear, fut, asoboung. nor. hovoa: anarraw, I meet with, fut. anarrhoopas, 110r. απήντησα; απολαύω, Ι enjoy, fut. απολαύσομαι, nor. ἀπέλαυσα; etc.

The following verbs in -que and -ee, whose stem originally ended in av and ev, resume the av and ev in the agrist and future, and partly also in the perfect :-

καίω, Ι burn, fut. καύσω, aor. ξκαυσα, perf. κέκαυκα, perf. pass. κέκαυμαι, aor. pass. ἐκαύθην, fut, pass. καυθήσομαι.

κλαίω, Τ πεερ, fut. κλαύσομαι οτ κλαυσούμαι, 20r. ξκλαυσα.

Bis. I ran, tur. 6-bonum or flavorium. (The other tenses are wantisg, many being supplied from the verb roixe, which is itself the errest, and

has to be sumdemented from other sources.) rew, I skim, fat. reisonas er revoorpas, 201. is evoa, perf. vérenca.

πλέω, Ι sail, fut. τλεύσομαι (commonly πλευσούμαι). ποτ. έ-λευσα. perf. πέπλευκα, perf.

pass. πέπλευσμαι, nor. pass έπλεύσθην. πνέω, I breathe, blow, fut, πνεύσομαι οτ πνευσοθμαι. nor. Eureuga meri, mémbeuga, meri mass, mémbeugμαι, nor, pass. έπι ευσθης.

Remark that bew. I flow, has fut, byngouss, nor. έρρύην, peif. έρρύηκα. Also that χέω. I pour out. deviates from the foregoing-fut, occasionally being yea, though more frequently yeven, nor, eyen, perf. κέχνκα, fut, mid, γέσμαι, nor, mid, έγεάμην, perf. mid. or pass sérbua, nor pass, existe, fut, pass, rusti-

σομαι. The following verbs, in addition to the common future in -σομαι, have a form in -σοθμαι. This circumflexed future is called the Doric -

φεύγ-ω, Ι flee, Int. φευξοθμαι, also φεύξομαι. waiC-w. I play, fut. waifovaai, also maifouai, min-re. I fall, fut, megoduat,

The verbs κλαίω. πλέω, πνέω, νέω, and θέω, given above, employ this form of the future,

The following pure and impure verbs, which, by the assumption of an e as characteristic, pass into the analogy of pure verbs in their transformations, have independent forms for the subjunctive perfect and optative pluperfect, middle or passive :-

кта́-оµа, I acquire; pert. ке́ктуµа, I possess; subj. neuropau, -fi, -firat; plup. eneurhane. I ressessed; opt neuropay, - 60, - 670. or neuropay, кектфо, кектфто.

καλέω, I call; perf. κέκλημαι, I am called, I bear the name; plup. ἐκεκλήμην, opt. κεκλήμην, -ĝo,

SYNCOPE AND METATHESIS.

Some verbs, in some of their forms, throw out the stem-vowel, which stands between two consonants. This ejection is termed syncrps. Thus, eyeiρω, I arrake, transitively (the agrist is regular, tiverpa), 1 perf. eyhyepna, I have awakened; 2 perf. έγρηγορα, I am anako; 2 plup. έγρηγόρη, I anoko (intransitive); aor. mid. ηγρόμην, I arroke (intransitive); πέτομαι. Ι fly. fut. πτήσομαι, nor. ἐπτόμην, inf. πτέσθαι.

By metathesis is meant the displacement of a vowel by a liquid. Thus, in Tétunga, I have cut, from τέμνω (for τέ-τεμ-κα), the liquid μ has taken the place of the vowel ε, which is lengthened into η; so in $\pi\tau \eta \sigma \sigma \mu \omega$, from $\pi \ell \tau \sigma \mu \omega$, $I \not H y$; and so in $\beta \ell \beta \lambda \eta \kappa a$, from $\beta \omega \lambda \lambda \omega$, as appears in these instances:—

βάλλω, I throw, fut. βαλώ, nor. έβαλον (BAA-), perf. βέβληκα; perf. pass. βέβληκα; aor. pass. έβλήθην, fut. pass. βληθήσομαι, 3 fnt. βεβλήσομαι.

δαμάζω, I tame. Int. δαμάσω, nor. εδάμασα (ΔΜΑ-), porf. δέδμηκα; porf. pass. δέδμημαι; nor. pass. εδαήθην, εδάμην.

καλέω, I call, fut. καλώ. nor. ἐκάλεσα, perf. κέκληκα; perf. pass. κέκλημα; 3 fut. κεκλήσομα, nor. pass. ἐκλήθην, fut. mid. καλοθμαι, nor. ἐκαλεσάμην. κάμνω (Lat. labbro), I labour, I am τα trouble,

2 αστ. ξκάμον, fat. καμούμαι, perf. κέκμηκα. τέμνω, Ι οκί, 2 αστ. έτεμον, fat. τεμώ, perf. τέτμηκά;

mid. I cut something for myself, perf. pass. τέτμημα, aor. pass. ἐτμήθην, 3 fut. τετμήσομα.

KEY TO EXERCISES.

Ex. 103.—1. The boy had written the letter. 2. The cheeps sent ashers and rate the city. 3. Not even all time can (i.t. could) blot out the friendships of good seen. 4. Anger often hides (genuin coverig) main reason. 5. Time burset the power of the Thekans in the grave of (ilt abusy with) Epaminondas. 6. Euripides was bursten in Maccolonia. 7. God has hidden the future from men. 8. You would be pleased at hearing a sweet modely, 0. The solders left they ranks.

Ex. 104.—1. 'Η έπιστολή ύνα τοῦ παιδες γέγραπται. 2. 'Ο παίε τὴν 'επιστολήν 'έγιαρεν. 3. Οἱ παίδες τὴν ἐπιστολήν 'έγιαρεν. 3. Οἱ παίδες τὴν ἐπιστολήν γεγαφάναι. 4. Πευθερίε εἰπριέβουμαν ἐπι την πάλιστο τὸν τῶν πολειών. 6. Οἰνο παλλένται τραίτει ἄ ἀπόματος τὰν τῆ καρδία κείκογεία. 6. Τα μέλλον τῆν ἀπόματος τὰν οἰνο κακάνεται. 7. Οἱ ἐκεκδαιμόνοι νοὰν παίδει τὰ υπόμορίε τὰντιν τῆν ἐρεγαμο. 8. Καλόν μελος τὰμᾶ τόμπτι. 9. Ο Ποιλάμει την πάλιν ἐπίγομο.

ITALIAN.-XIV.

[Continued from p. 65.]

INTERROGATIVE PRONOUNS.

Chi? meaning who? is used in speaking of per-

sons of both genders and numbers.

Che.' signifying what? is used in speaking of

. Che. signifying what? is used in speaking of things.
Onale? signifying what? is always joined to a

substantive, and used in speaking of men or things of both genders.

INDEFINITE PRONOUNS.

Alcuno, some, anyone, some people, is sometimes used alone, and sometimes with a substantive; in tho latter case it must agree with it in gender and number.

Altro, signifying differently, something else, another, etc., may be used alone, or with a substantive; in the latter case it agrees with the substantive in gender and number. Clascheduno and ciasenno, meaning everyone, each, etc., are used either alone or with substantives. When they are prefixed to substantives, they agree with them in gender, and seldom admit of a plural.

Acsume or nissune, niune or nulle, meaning nebody, anyone, ne one, no, etc., are employed alone or with nouns. If they are united to a noun they

must agree with it in gender.

Ognl, signifying erery, all, is indeclinable. It is put before nouns in the singular, and seldom in the

plural.

Tatto, signifying everything. all, joined to a noun, is liable to gender and number.

VERBS.

Every verb must agree with its subject, either expressed or understood, in number and person. Two nouns or subjects in the singular, united by

e, and, require the verb in the plural.

The following verbs have no preposition after

mem betote a tollowing maintive:-			
Bisogna, or Bisog- nare, if is accessary. Convenire, to agree. Dovere, we supal. Fare, to do.	Lasciare, to lct. Osare, to dure, Parere, to seem. Potere, to be able. Sapere, to know,	Sentire, to hear. Solere, to be acom tought, Vedere, to ser. Volere, to choose.	

The following verbs have di after them before a

following infinitive:—			
Abborrire, to abhor. Accadere, tohoppen Accennare, to show.	Conculudere, con- cludere, to con- clude.	Glorarsi, to pride oneself Godere, to delight.	
Accortage, to assure.	Consigliare, to ad-	Guardara, to be-	
reconstnend.	Contage, to reckon.	Immaginarsi, to	
Accordare, to ornat.	Conteners, to re-	imagine.	
Accorgersi, to per-	frain oweself.	Impedire, to hinder,	
crite.	Contentarsi, to ron-	intporre, to timpore,	
Affliggersi, to grieve.	zent.	Incaricare, tocharge.	
Ammonire, to ad-	Convenire, to agree.	Increscere, to be	
monish.	Credere, to believe.	sorry.	
Annolarsi, to be	Curare, to cure.	Influgeral, to pre-	
torary.	Degnarst, to deign,	tenil.	
Ardire, to dare.	Deliberare, to de-	Ingegnarsi, to en-	
Arrischiare, to ten-	liberate.	dearour.	
fure	Determinare, to de-	Intendere, to under-	
Assicurare, to as-	termine.	stand.	
sure.	Differire, to differ.	Lamentaisi, to com-	
Asteneral, to abstain	Dilettarsi, to delight.	plain.	
from.	Dimandare, to ask.	Lasciare, to cense.	
Attentand, to at-	get.	Lusingarsi, to fatter oncolf.	
Avvedersi, to per-	Dire, to tell,	Maneare, to fail.	
ceire.	Dispensare, to dis-	Meditare, to modi-	
Avventurare, to rea-	Drust.	tute.	
ture,	Disperare, to de-	Meritare, to descrire.	
Avvertire, to ad-	spair.	Munacciare, to	
montak.	Displacere, to dis-	threaten.	
Avvisace, to inform.	libe.	Mostmre, to show.	
Badare, to mind.	Dolersi, to grier.	Negare, to refuse.	
Binsimare, to blame.	Domandare, to ask.	Negligentare, to ne-	

Fermard, to stop Fragure, to parter Finue, to fluish.

Giarare, to antar.

```
Process U.C. Rimprovenue, rin. Science, it oriests
                          Rimprovenue, rin- Susara, to area; fitelare, to marsif.
Prezwe, tree to t.
                           Rinery-cere, to be
                                                     Septement, to sep-
  2-1-0.
Promore, to pro-
                          Ringrariare.
                                                     p.rt.
sperme, to kepe.
Stohere, to d'a-
swele.
Supplicare, to en-
troit.
Pretendere, to pre-
to d.
                                                 10
                          facul.
Representate, to re-
Professare, to te;
Professare, to pro-
                          Risolvere, to re-
Profibire, is profit it
                                                     Temere, to ferr.
Tentare, to try.
                           Ser there, to choose,
                          Scommettere,
Property, to pro-
Promethere, to pres. Songineare, to con-Transceiare, to the large te control.
Pleasethere, to pro-

othe. Jury to entroit sist.

Recordersi, to re. Sconsuchare, to dis-

whamel,
```

The following verbs have a after them before a

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following infinitive :-
  Accomplete, to execute, to consulting, to consultin
  Accompanie, to
exempting.
Accordings in to or-
                                                                                                                       consultare, to ad-
                                                                                                                                                                                                                                          Octupard, to occupy
overly.
Offarsi, to ofer over
                                                                                                                     Continuare, to cor-
tinuare, to cor-
Convenire, to agree.
Contragere, to al-
     certors.
Adestare, to allere.
Affrettare, to haster.
                                                                                                                                  otragere, to D
     Agevolare, to farili-
                                                                                                                                                                                                                                            Ostinars, to jes-
                                                                                                                     Ostringere, to Delige.
Direl, to addict one-
ty.
Disporte, to dispose.
Ecentare, to exist.
Eventure, to export.
Esperie, to export.
Esperie, to export.
                                                                                                                                                                                                                                            rid.

Pensare, to third.

about.

Persundere, to persundere, to persundere, to persundere, to pre-
personnerelf.
  Aintare, to aviet
Alleinre, to allure.
Andare, to gr.
Animare, to are-
     Arrivare, to arrive.
                                                                                                                                                                                                                                            Principlare, to be-
  Asparare, then in.
                                                                                                                     I'red, to become.
Gangers, to arrive.
Imparare, to learn.
                                                                                                                                                                                                                                                       gin.
huseire, to surger!
     Aven. tiler.
                                                                                                                                                                                                                                          Seguire, seguitare,
to continue, to
follow.
Spingere, to urge.
Steniare, to work.
                                                                                                                     Imperati, to july los. In stare, to incite. Incompensate, to en-
  Arresante, to erry
tr. t.
Avveznara, toame-
tm ere. f.
Companiare. to best.
                                                                                                                                                                                                                                       Steniare, ... hard.
Supplicare, to entrut.
Tendere, to tend.
Tornare, to return.
                                                                                                                       courage.
Indutre, to induce
  Condinuere, to con-
derin. Insegnare, to teach.
Combissemilere, to intraprendere, to combissemil.
Conducte, to conduct. Mettersi, to setabout.
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PARTICIPIES

The past participle, used without an auxiliary, must agree in gender and number with the substantive to which it refers.

The past participle, being used with the verb essere, to be, must agree with its subject in gender and number.

The past participle, used with any tense of the verb avere, to have, is indeelinable when it stands before, and nearest to, the word which it governs. When the auxillary verb intervenes, or the object precedes, the participle agrees with the object in number and gender. (Ho soritto una lettera; non le ho veduta : le miserie lasciate hai.)

ADVERBS.

The Italian adverbs are generally placed after the verb in its simple tenses, or between the auxiliary and the past participle in its compound tenses.

. There are many exceptions, for the Italians place

sometimes the adverbs in the 1 _inning, in the middle, or at the end of a sent new

PREPOSITIONS.

In Italian, prepositions are commonly placed before the words which they govern, e.g. :-

Tatelo per me, do it for rec. Vicino al fonte, near the foun-

CONJUNCTIONS

The following commetions, and all those that are attended by a preposition, require the yeah which follows them to be put in the infinitive :-

A fine di, in order to. In vece di, instead of Prima di, before
Avanti di, lefore. Per, to [f.ar. Seuza, without,
Dopo, ofter. Per paura di, for Avanti di, lefore. Dopo, efter.

The following conjunctions require the verb which

follows them to be put in the indicative :-A causa che, be oue Di maniera che, es that. In tanto che, es that. Mentre che, while, Oltre che, bendes that, Secondo che, according as-Se non che, except. Subito che, as soon as, etc.

The following conjunctions require the verb which follows them to be put in the subjunctive :--

Accincche, that. Affinche, in order that.

Avanti che, before Dato che, suppose that. Prima che, before that. tant.
Avvecnaché, though.
Brache, although.
Caso che, in costhat.

Purcle, provided
that. Senza elie, without that.

The following conjunctions sometimes govern the indicative, and sometimes the subjunctive :-

Fino che, finché, finattantoché, infino che, intinché, infi-nottantoche, till or until. Perche, vhy. Quando, when. Se, V. Excetto che, unless.

Schbene, though.
Se bene, although.
Che, that.
Concrossache, conclossacosache, for.
Attres che, since.

THE ORGANS OF SENSE .- VIII.

[Continued from p. 44.] IV -THE ORGAN OF TASTE (continued).

CONSIDERING, then, the sense of taste in relation to its uses, we find that not only does it stand at the entrance of the passage for food, to guard the gate, in order to admit good citizens and exclude conspirators against the constitution, as the senso of smell does, but it has other important functions.

First, it stimulates to the act of grinding the food and reducing it to a pulp, giving, by the pleasure it occasions during the process, an inducement which the bare knowledge of the fact that this comminution is necessary for the after digestive operations of the stomach, could hardly supply. Secondly, from the sensibility of the tonguo

becoming greater as the food proceeds backwards, it causes it to be carried in that direction while being masticated; and finally, in order to enjoy the most exquisite sensation of taste, the feeder finds it necessary to fling the bolns backward on to the root of the tongue, and there it becomes the subject of a curious mechanical process. Until the food has reached this point, it is perfectly under the control of the will of the feeder, and it can be moved in any direction, and entirely ejected from the mouth, if he find it hard or nauseous; but directly it has reached this point it passes at once out of_ his control. The presence of food at this point excites what is called the reflex, or involuntary, -action of the muscles of the throat, so that the soft palate above the throat behind seizes it and thrusts it at once rapidly down into the stomach. This involuntary action is ourious, not only because the presence of food invariably excites it, but it cannot be excited unless by the prosence of some substance at that part. The act of swallowing cannot be effected unless there be something to swallow. Further, if a foreign body touch this sensitive part, and it cannot be swallowed, the stimulus is so violent that, being denied its legitimate result, it will excite the reversed action and occasion vomiting. Thus, while Nature ungrudgingly grants sensuous gratification where bodily wants exist. she imperiously denies all pleasure if no good end is connected with its gratification. However sad the fact may be to him, the glutton knows that there is a strict limit to his enjoyment. Alas for him l he cannot by any device revel in the pleasures of the table without filling his stomach, and this is of very limited capacity.

In the case of taste, then, the mutual dependence of bodily necessities and the gratification of the sense is very marked; and a consideration of the whole circumstances connected with this sense has been used as an argument in favour of the unity of the creation and of the omniscience of the Creator: for we have, as essential conditions of the pleasure of eating, four distinct things, in no way necessarily connected with one another, except as they are designed to relate to each other. They are these:-The body, requiring aliment; the sense of taste, prompting to feed; wholesome food, fitted to maintain the body in well-being; peculiar, and often superadded flavour's, to tempt the sense, Putting these in the order in which they are related to one another, we have-food, flavour, pleasure, health. The distinct links in the chain are all wonderful, and to many minds the nuion proves a unity of design and a benevolence of purpose.

In treating of the objects which excite the sense of taste, we must draw attention to the distinction between taste proper and the alimentary sensation of relish. That these sensations are different will appear from the consideration that many things which are very appetising, and in the eating of which there is great pleasure, have but little distinctive taste. Butter and animal flesh are good instances of this. The tip of the tongue applied to these would give but little indication of the presence of sanid bodies: but the succeeding parts of the organ and the month declare them very good. On the other hand, sweet and bitter principles are detected at once by the tip of the tongue, though they be entirely indifferent to the sense of relish. Alum is thus sweet to the sense of taste, but disgusting to the sense which we have called alimentary. The sense of taste proper, or the appreciation of what is sweet, bitter, sour, etc., is more connected with the intellect than the sense of what is savoury; and hence it is less dependent on the state of thebody, and it leaves behind it a multitude of distinct ideas which can be held in the memory. Thus a person when suffering from sca-sickness can well discriminate between sugar and quinine; but he would be a very indifferent judge of the flavour of a beef-steak at such a time. The multitude of flavours which can be distinguished is truly remarkable; for not 'only does the apricot, plum, cherry, and apple each have a characteristic taste, though they all belong to the same order of plants, but a hundred varieties of apples all challenge recognition from this sense. The grape produces a thousand wines, each with a bouquet of its own, oven thoughalcohol and water are the main constituents of them all, and that which causes the difference is so small in quantity, that the chemist often cannot separate it. Some sensations described as tastes are but little removed from those of touch: thus, the taste of nutgalls, called an astringent taste, and the fiery taste of alcohol; are probably caused by mechanical action on the outer skin. In the first case the forcible contraction of the parts occasions 'a roughness; and spirit will produce a burningsensation on any delicate part of the body We have now to apply our experimental know-

lodge of the sensation dorived through the tongue and month to the [nquiry—How far do brates participate in these sensations? In order to answer this question, we must observe the gestures and exhibitions of animation of animals while feeding on those substances whose tastes we are courselves acquainted with. Observation seems to lead to the conclusion which we should naturally have arrived as from reasoning on the question. The conclusion it this, that the sensation which we have called the alimentary feeding, and which is of a more animal character, is enjoyed in a greater degree in

the brute than in man, while the true gustatory sense, being more connected with the exercise of the mental powers of comparing and distinguishing,

is certainly weaker in the lower animals. Brutes may be roughly divided into two gres divisions, the carnivors, or flesh-cuters, and the herbivors, or vegetable-exters. The type of the first class is the tiger, or, to give a more familiar exumple, the cat; while-the other is represented by tise ox. In each of these the whole body seems to have been constructed in relation to the food, The tiger has jagged back teeth, and pointed side fangs which look deeply into one another, but have ano grinding surface. The jaws that wield these are short, strong, and can play only to and from one another. It can therefore grip and hold, but cannot oliew. . The stemach is small and intestines short, beenuse flesh is very nutritions, and needs but little digestion. The fore limbs can move freely in all directions, and are furnished with claws to strike and seize. The ox has long jaws, rough but that hind teeth, and a close-fitting row of front ones in the front of the lower jaw, playing on a pad in the upper, and the lower jaw can swing sidewnys and so grind the food. He can therefore city and chow, but cannot grip.

This comparison might be carried into ulmost every detail of structure. We cannot, tisen, in speaking of the sense of tasto in mammals, speak . of the class as a whole, because the objects of the sense are so different in the two divisions of the class. It mest not be supposed that this division of brutes is sharply drawn; for between the two types of tiger and ox, animals of every grade of intermediate structure are found. Moreover, the division is not a good one for the purposes of zoological classification; for though both the tiger and the Tasmanian dayil eat flesh, and the kangaroo cuts grass like the ox, yet even the tiger is more like the ox, and the Tasmanian devil more like the kaagaroo, than are those animals when crosscoupled, as in the first sentence. Further, some brutes made on the flesh-eating type cat all kinds of vegetables, as the bear does; and others built on the plan of herb-caters will eat flesh, as the pig will. In fact, the division is a false one when we are treating of the classification and structure of animals, but it is nevertheless a useful one when wo are writing of their powers and functions. In other words it is a good physiological but a bad anatomical division. We have entered so far into the question, not only because it bears on our special subject but also because it explains the term "physiology.

out his because it expains the term "poysiongy."

Of carnivorous animals it may be stated that the alimentary sense, which is associated not only with the tongue, but with the threat and palate, is keen and

of the sense of taste is feeble. That which we call ravenous hunger in a dog or lion is not the uneasy feeling of privation which we associate with excessive hunger, but is an ali-engrossing desire to gratify the sense of taste, and this is altogether distinct from a dainty appreciation of flavour, These seimals can endure privation from food for considerable periods without manifesting any signs of starvation ; but the smell, sight, and, most of all, the partial taste of flesh, excite them to eager and even ferocions eraving. Hence the popular notion of the dangerous nature of wild beasts which have once tasted blood is a true one. On the other hand, when the food is once obtained. It is torn to pieces, flung to the back of the mouth, and swallowed with a rapidity which altogether forbids the idea that these animais possess to any extent the faculty of discrimination in their tastes. This view of the question is also borne out by an inspection of the tengue. In the lijustration (Fig. 12) the reader will find a representation of a cat stoague. This tongue is iong, and has but few round papilite; but it is covered with n dense pilo of long, thin, pointed, overlapping projections (fillform papillio), which are directed backwards, and towards the mid line. The circumvalinte papille, again, are but four in number, two on each side. It is this pile of pointed papills which makes the cat's tongue feel rough when she licks. The covering of these papille is so douse, hard, and thick, when compared with that of our own, that we are justified in think-

pleasurable in the extreme, while the other branch

of the other kinds.

In the larger amounts of the ent family them for the kinds with the high state of the larger and the the

ing them mechanical only in function; and yet

they cover the whole tongue almost to the exclusion

be injured by them.

In illustration of these remarks we may give an incident. A gentleman had reared a tame loqued, from a cub, and having always fed it on brend, etc. the animal was very decile, and showed no sign of swaganese. It was often curessed by its master, and returned the bhandishments after its monner. While thus engaged, it one day took its master's

hand into its month, and began to lick it girally, but owing to the roughness of the tongon it caused some blood to flow. The gentleman, no 'doubt' robulgs come pain, tried low vithdown his hand, but, to his sarprise, the besis for the first time in its life began to grow. 'With great precessoo of under the gouldcann releated from his effort to release his hand, rang the bell gashed his several for his loaded pistol, and then shot his now dangerous favourite through the bell.

In herthicorous animals, while the sense is farless keen, so far as the alimentary sensation is concerned, we have no reason to suppose that the distinguishing gustatory sense is in any degree stronger.

The main mass of the food of the runinants is insipld. Fre-liness is the strongest term that can be used to express its desirability. A large bulk is required for but a little nutriment. Thus we find the ox occupies a considerable number of its wakeful hours in grazing and chewing, and it feeds along the pasture, tearing up the grass with but little discrimination. It is true that a cow will avoid noxlous or di-agreeable plants when they grow in clumps; for a field otherwise closely cropped still presents long stalks of the common latterens. It would seem, however, that this aroidance is rather due to instruct than to disgust. Many plants have very powerful bitter, sour, and astringent principles, and they are intimately mingled with the grass; yet, as we seldom see a cow eject the food from its month, we cannot suppose it to have any very delicate sense of taste. From the fact that oxen ruminate, we might suppose that they enjoy the sense of taste while chowing the end. So doubtless they do in a minor degree; but the net by which the food is returned to the mouth is probably enite involuntary; and the lazy, dreamy way in which an ox runinates contrasts strongly with the avidle with which a carnivorous animal foeds.

The tongue of a rumbant is very long and flexible. It is often wiveled round the heringe to tear it mp, or break it off; and the qualities which fit it is for this no are manifested in the highest degree in the tongue of the primite. This animal can extend by the length of this member is already great powers of reaching high, and thusbest down the branches of the palm. Well night needs them the branches of the palm. Well night organism had been used liked by a constant embessor or passible that the part of the part of the part of the organism had been used liked by a constant embessor.

The position of the large walled-round papille is very various in different animals. The reader will have observed their position in the chimpanase, in one long line of about twelve in number down the middle of the tongue, with a few sentered ones on each side. In the pig, otter, and scal, they have the V-shaped arrangement which they have in mm, but are fewer in number. In the sheep they form a thick raised ridge on each side at the back of the tongue.

One of the most-singular uses to which the tongue is put in this class is manifested by the ant-caters, whose long slimy tongues are used to thrust intoants nests, so that when they are retracted into their long tubular mouths the auts are carried with them, adhering to the muser.

If this article had been headed "The Tongue," instead of "The Organ of Thate," we should have a leng task before us to describe the various shapes of the organ in teach and regules, and also in smill-and instead of the organ in teach and regules, and also in smill-and insects. The organ to which the word tongue has been applied has a wonderful diversity of form, and many interesting reculiarities; but in most produced to the control of t

In birds the tongue is almost as diversified in form as the beak; but it is usually cased in horn at its fore part, and there are only a few papillse above the air-hole. In parrots it is fieshy; and these birds seem to have more of the sense of taste than most hirds, for they will turn a lump of sugar or a nut about in their beaks for some time to test its qualities before eating it. It is certainly singular that birds, whose proper food is frult, should be so little endowed with a sense to appreciate its delightful and delicate flavour; nevertheless, it seems as though the tonone were only applied to test the softness, and therefore the ripeness of the fruit. The tongue drawn to represent (Fig. 12) that of the fieldfore may be taken as the typical tongue of a bird. The small triangular tongue of the estrich, supported on its slender arch of hone, is given because of its singular shape and shortness. The length of the tourne has but little relation to the length of the beak. Thus both the nelican and the tonean have enormous books: but the former has a tongue as short as that of the estrich, while that of the latter is very long. The tongue of the woodpecker is a living harpoon.

taste, but it is dombiless inferior to that of higher mininals. The tompose of the chameleon, given in the engeming (Fig. 12), is of a curious shape; and the meantmash by which it can be darted upon a landless fig is chalorate and interesting; but its descriptive would be out of place here. In the tend and freg the tompek grows as the tail drops off. If the control of the control of the control of the lockward, so that its bi-foldest and the free in the usualth, and, can be fullipped forward out of that quity. This is also rather an organ of, preferation

In some rentiles there is evidence of a sense of

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than of taste. Pur that a frog has some sense of taste may be easily shown by giving him the "durg-worm," so good as bait. This worm candes a yellow third, and as the frog tastes this his efforts to free himself from his food are sometimes most comical to behold. The forked tongue of the snake is familiar to everyone. Its reiterated protrusion and vibration have led the valear to consider this action as a threat, and to believe that it is the sting of the animal. It, however, has no such function, It may have some power of tasting, but it is more probable that it is an organ of touch; for this creature, limbless and covered with hard scales, is greatly in need of a means of feeling outward oldects.

Fishes' tongues have soldom any soft parts, and cannot therefore be organs of taste. They are not unfrequently furnished with teeth. In some fish a cushion of soft substance, well supplied with blood-vessels, is found on the roof of the mouth.

All the higher orders of mollusca have an organ to which the name of tongue has been given, and some nuthers have proposed to group together the head-walkers, belly-walkers, and wing-footed classes under one subdivision. calling them odontophera, or animals which have a tooth-bearing tongue. This organ in smalls (gastropods) bears transverse rows of testh arranged in complicated and beautiful patterns, and is sometimes so long as to be called the lingual ribbon. As it is often used to file away shells before devouring the animal contained within, its function must be considered as other than that of taste.

The bee licks up its honey with a very complex tongue; but us this member is composed entirely of a horny substance and stiff hairs, it cannot be used to taste the sweet compound elaborated by the flowers. An internal cavity to hold food during the time necessary to its digestion is so generally present in animals that it almost serves as a character whereby to cut them off from the vegefable kingdom. A prompting to fill this eavity is of course always associated with the organ; but whether that prompting is automatic, instinctive, or rational, it is difficult to say. A sense that may be pleasurable or painful seems to imply some power of reasoning to make it useful. A sense which is neither pleasurable nor painful may stir but a blind instinct. There is, however, a lower impulse to action than even this, in which both intelligence and sense may not be at all involved. When the contact of food causes the sea anemone to close its arms around it, and force them into its mouth, it is probable that sense is no link in the chain of causes of this act, but the whole process of ingestion is parallel to that part of the action 176

of swallowing which takes place in us after the senses have done their work, and the throat seizes the morsel of food and carries it down to the stomach by an involuntary act. Automatic and consensual acts are often as violent as those prompted by desire and reason, so that eagerness in feeding is no infallible evidence of taste in the lower animals. We abstain, therefore, from describing those various and interesting organs which lie in such a relation to the entrance of the alimentary canal of snails, flics, bees, etc., as to have been called tongues, as though they were organs of sense.

SPANISH .-- X. (Continued from p. 55.)

DEFECTIVE VERBS DEFECTIVE VERBS are those which are not em-

ployed in all the tenses or persons. 1. Soler, to be accustomed, is frregular, and

seldom used except in the following tenses :-IND. Present. Suelo, sueles, suele; solomos, soleis, suelen .--Juperfet. Solin, soline, solin; solinmos, solinis, solinis,

2. Facer, to lie, is not often used in any other persons than the third persons singular and plural of the present indicative, chiefly at the beginning of epitaphs:-

IND. Prevat. _____, yace; _____, yacen.

3. Podrir, to rot, is seldom used except in the second person plural of the imperative, podrid; and the third person singular of the imperfect subjunctive, podriria.

When podrir is figuratively used in any other moods or tenses, it is to be conjugated irregularly in the same tenses and persons as servir, by changing . the o of the verb-root into u; as, pudriendo, rotting.

IMPERSONAL VERBS.

Impersonal verbs (or unipersonal verbs) are those which are employed only in the third person singular. and having no subject, take it or there with them in English: as llucre, it rains: trongra, it will thunder: niere, let it snow: hav, there is, or there are: habrá, there will be.

- 1. Llover, to rain, is thus conjugated impersonally :-
- INF. Past Participle. Llovido,-Gerund. Llov. ando IND. Present. Lineve, it rains .- Imperfect. Liovin, it cons
- raining.-Perfect Dofinite. Llovid, it rained.-First Fature. Lloverà, it will rain.
- 2. Linera, let it rain, is thus conjugated :-Sun. Present. Lineva, it may rain,-Imperfect. Lioviera, it trould roin ; Hoverin, it thould rain ; Hovere, it might rain --

First, Future, Si lloviere, if it should ratu.

..

All the impersonal verbs are conjugated like some of the verbs whose conjugation has been already

given; thus, *llorer*, it will be seen, is irregular, and is conjugated like *mover* in the third person singular of each tense.

Haber and hacer are often used as impersonal verbs, and are in such cases to be rendered in English by the tenses of the verb to he, as, hay, there is, or there are; hace, it is.

3. Haber, to be, used impersonally, is thus conjugated:—

INC. Past Participie. Habido.—Gerund. Habsendo, there being.

IND. Present. Hay, or ha, there is, or there are.—Imprefert.

Habia, there was, or there were.—Perfect Definite, Hubo, there

was, or there were...First Future. Habri, there will be.

4. Haya, let there be, is thus conjugated :--

Sun. Present. Hayo, there may be.—Imperfect. Hubiera, there would be; hubius, there should be; hubiese, there might be.—First Future. Bi hubiere, if there should be.

Hay, habla, and hubo are rendered in English sometimes in the singular and sometimes in the plural, necording as a singular or plural noun follows: thus, hay una mager que tiene calentura, there is a woman who has a fever; hay mageres que no la tuene, there are women who haye it not.

Macer, when employed importantly, is to be rendered in Rigids by the verb to be, as, here, it is 1 hards, it was: hirs, it was 1 hards, it will be, hoga, it may be, etc.; thus, hards felo, it will be cold: hore mucho airs, there is much wind; here lenner, there is in most, hore how it lemps, it is good vertically the late there are full muriel, it is ten months since she died.

5. Placer, to please, is used impresonally in the following tenses only:-

18th, Prevail, Place, it plants — Imperfet, Placia, it was spirating.—Perfect Indefaulte, Plugo, it pleased. San, Prevail, Plague, it may please.—Imperfet. Phagaca, it would please; plaguese, it might please.—First Future, St plaguese, it should please.

The persons of placer in the subjunctive are used only in these expressions: plague, physicre, or plugieze d Dies, may it, should it, or might it please God; si me plugieze, if it should please me.

There are some verbs that can be need in all the persons of the tenses, and also, at times, unpersonially, as, e amy tarde, it is very late; e precise, it is necessary; e smeaster, there is necessity; parcea, at suits seats, it is sufficient.

REMARKS ON THE SYNTAX. THE ARTICLE.

The definite article is to be used before all common nouns taken in a general sense, and in the whole extent of their signification: as—

El édio levanta reneillas, La caridad es paciente, Los hombres son mortales. Men are mortal. If the nonn be not taken in a general sense the article is not used; ns-

Hace buen tiempo, It is good weather.
Tiene cuvidia, He is cavious.

The definite article is used before proper names / of countries, states, and days of the week; as—.

La Francia cs un hermoso pais, France is a heautiful country Juan volvene el Martes. John well treaten or Tracedey,

The definite article is to be used before numerals indicating the day of the month or the hour of the day; as—

Et seis de Euero, The sizth (siz) of January.

A las tres de la tarde, Al three o'clock in (of) the after-

The definite article is used before nouns indicating the rank, office, profession, or titles of personwhen they are spoken of (but not when they are addressed); as—

El General Brown es vallente, General Inorn is brore. La Señoia Tranor no es pru- Alzs. Tronor is not prodent dente,

The definite article (and not the indefinite, as in English) is used before nome signifying a certain weight, measure, size, quantity, or number, when preceded by the price, and to specify time; as—A tree dures to libra,

At three dellars a (the) pound.

A dos pesos la vara.

A rizon de dier dinos et mes.

Al (litr) rair of ten dollars of of ten dollar

may be used after the price; thus, we can say, a tres dures la libra, at three dollars the pound; or, a tres dures per pound. The definite attlele is not used before a noun which denotes relationship or kindred of another nonn, when a verb couse, between them: as—

Maria es hermana de Juana, Mary is the sister of Jane. Publo es lujo del juez, Poul is the son of the judge.

The definite raticle is not used before proper names nor before nouns in apposition, when not employed in a definite or determinative same; as—Pablo, specta on at befor, eye—Taube, state points of the facility range de sus points. They inned against the Lord, range de sus points.

ranza de sus podies, the hope of their futhers.

The definite article is not used before numerical adjectives when they denote order or succession:

Tomo regando, pigina sexta.

Folume the second, pose the sizth.

Enrique octavo.

Forum the Eighth.

The cardinal numbers (and not the ordinal) are generally used when the number expressing the order or succession exceeds inne; thus, Calos doce. Charles the Twelfth (literally, Charles Tweler), and not Calros duodelems; tomo trece, robust thirteen, and not tomo declusiered, when thirteen the

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The titles of books, essays, chapters, or estimats, and the names of periodicals, do not generally take the definite article before them (except when spoken of): as—

Historia de España. Gaesta de Lenvires The Hi bory of Spain. The London Gazette.

The indefinite article is not generally used when some portion of a thing only is meant, and when the adverb nv is used in the sense of not a (that is, not any), or nos as—

Tiene calentinm

Ella tiene vice de comer,

Juan hace ruble,

The indefinite article is not used before two

nouns, one of which, being connected by a verb to the other, shows the nation, relationship, rank. office, profession, or vocation of the latter; as—

Juan es Frances, Clrlos es impresor, Hallo en él padre y madre, de mother, o mother,

The indefinite article is not used before a noun in apposition with another; as-

Extéban, hombre lieno de to, Stephen, o man fell of faith.

The indefinite article is not used in the title of

a book, chapter, or essay; as—
Colercion de los mejores an— A collection of the best Spanish tores Españole.

The indefinite article is not used before a noun in an ejaculatory phrase; as—

in ejacolatoly jamase; as—

; Qu. ideal ; Qu. desgracial What an idea' what a misjortune!

The indefinite article is not used between an

adjective and its noun : as—

Mr-ho peso, helf o dollor.
En tal tiempe, tu such a true.

Tan hermon hijs, so becutifet a daughter.

The indefinite article is not used before the words medio. a half; eien or ciento; a hundred; and mil, a thousand; as—

Cun hombres, o hundred men. Dia y médio, a day and a bolf.

The indefinite article is not used after algo, something, or nada, nothing, followed by the preposition de, as—

Pedro tiene algo de poeta, Peter is something of a poet.

The indefinite article can be used before (but not after) tal, such : as—

Tenemes untal Pontifice. We have such a High Priest.

The infinitive mood, being used in Spanish as a noun with a preposition before it, in the same

manner that the present participle is in English, ean take the masculine definite article before it;

El murmurar de las fuentes, The murmuring of the fountains,
On seeing the tree. The definite article is used 1 erore the adverbs mas, more, and ménos, less, to express the superlative degree of comparison; as-

Maria es la mashermosade las Rees . Us ; no horaciful of magere,

The article is generally to be repeated before nouns which immediately follow each other, especially if they do not agree in gender; as—

La prudencia y el valor del The prudence and the talour of rey, the king.

The learner will find many exceptions to the above rule in the best Spanish writers. The article must always be repeated in such cases when each noun is designed to be emphatic. When the word todo, all, sums up the several nouns, the article is not generally used before any of the nouns; as—

Espanoles, Franceses, Ingleses y Americanos, todos son mortales, and Americans are all mortal.

The article is omitted in Spanish, as in English, before nouns taken in a partitive sense; as—

El carpintero tiene dinero, The carpenter has money

THE NOUN.

AUGMENTATIVES DIMINUTIVES, AND COMMON

TITLES OF RESPECT.

Augmentative rouns are such as are increased in the extent of their signification by the terminations on, one, one, one, one of Thus the words dagger; conclusing, open if mind, frier; gato, determination, sheer; imager, versums; fronts, forehead, on berndered augmentative; as, dagger, large dagger: one property of the state of t

Diminutive noums are such as are decreased in the signification of these primitives by the termina-tions-top-fox-qip, qiq, -ito, -ita, -ta-cta, -ita-qid, -eica, -ita, -ita, -ita-qid, -eica, -ita-qid, -eica, -ita, -ita-qid, -it

Adjectives are also frequently found used in a diminutive sense: as, poco, little; poquillo. poquitico, poquito, rery little.

There is also a kind of nonns composed of the name of some instrument or object and one of the terminations are, ara, ada, the compound word including in its meaning both the instrument and some refire produced by it: as, dardo, a dart;

dardad, a blow given with a dart; enchara, a spoon; pluma, a spen; plumada, a does with a spoon; pluma a spen; plumada, a does or stroke with a spen; mano, the hand; manotazo or manotado; a blow with the hand; aldaha, a knecker; land didahada, a suy with the knecker; and aldahava, a violent ray with the knecker.

When a noun with a singular termination denotes several persons or things, it is called a collective moun, or noun of multitude: as, turba, a crond; vacada, a drove of cone.

The ordinary titles of respect, corresponding to Mr. or Seq. in English, are in Spanish & Seire and Daw; and those corresponding to Madam and Mrs. are & Seire and Deles; and Miss, & Seiretta. Daw and Deles never take the article before them, and on the used before Christian names only. & Seire and the second of the service of the service of the name. A few examples will show the manner in which these words are used:

Il Schor Blaic es Americano. Al Safor Den Diego Harper Mr. Rillet sen Alkerezan. Is American Friende Sen Don Diego Ficha Commission of Sendors Don Juan Millon mucho de verie, Mr. Americano, Ten cery god to John Millon and Festi Surret. Assess year. Da una silla à Doña Sanki

Ticknor, I am very glad to see you. Ei Senor Ray; Le Señom Ray, Mr. Ray; Mrs. Ran. La Señorita Mason, Mes Mason.

. The article is never used before these titles, except when the persons are spoken of; of course, when persons are addressed, the proper title only is used.

used; asBuenas tardes tenga V. Señorita Wilson.

I misk you a good evenlag, Miss
Wilson.

Señor, señora, señorita, señores, señoras, señoritas, also are used for sir, madam, miss, gentlemen, ladies, young ladies respectively; as-

Buenos dins, señor, good mornlag, ser.

Soñor and soñora are used as an additional mark

of respect before the name of a relative in such cases as the following:

Como está su soñor hermano? Como está su señora medre?

how is your brother # how is your mother f

THE ADJECTIVE.

AGREEMENT AND POSITION OF ADJECTIVES.

The adjective must always agree in gender and number with the noun to which it belongs; as—

El hombre salso, the voice Los hembres siblos, the voice seen.

Los mugers sabia, the wise too Los mugeres siblos, the wise

Participles used as adjectives agree in gunder and number with the noun to which they belong; as— Re engended very the deladed. Las suparhidas criedays the deking.

[gueru.]

[gueru.]

[luded finale screams. An adjective does not agree with the gender of the title of a person, but with the gender of the person to whom it is applied; as—

Su majestad està enfermo, kis Su majestad està enfermo, hermojesty is ill.

Nada, nothing, requires a masculine adjective;

. Nuda hay limpio, There is nothing pure.

Two or more nouns in the singular require the adjective which belongs to them to be in the plural, and if the nouns are of different genders, the adjective must be in the mascaline; as—

Jonna y Maria estan eatladas, Lucia y Carlos estan exusados, Jane and Mary are silent, Lucy and Charles are tired,

When an adjective comes before or after two or more plaral nonns of different genders, it must agree in gender with the noun nearest to it; as—

Buenos diccionários y gramáticas, pod dictionaries and gramanara.

The Spanish Academy recommends that in cases in which an adjective is to be used with two or more nouns differing in gender and number, it would be better to use a different adjective of similar meaning, for overy noun, or in a adjective which does not ohange its ending to form its feminine for the plant.

The material of which a thing is made, as well as the country in which it is made or produced, are seldom used as adjectives, but as a noun preceded by the preposition de; thus:—

Paño de lana, recellen cieth. Hoja de plato, eller leof. Cueros de Menco, Mexican Cerveza de Londres, Londonber.

hide. best.

The profession or dignity of a person may be qualified by an adjective derived from the name of a nation, or by a noun preceded by the preposition-

as above; thus :-
General de España, Spanish General mejicano, Mezican general (general of Spain). general.

The title of the chief ruler of a country is not qualified by an adjective expressing the nation, but by the name of the country, preceded by the proposition; as—

El roy de España, the Ling of Ei presidente de los Estados Sparia.

La reina de Inglaterra, the queno of England.

United States.

Adjectives of both numbers and genders are often used as nouns, being in such cases preceded by the article; as—

Un rico, a rich (man).
Una rica, a rich (noman).
Los ricos, the rich (noman).
Los doctos, the learned.

The neuter article (as it is called) lo precedes adjectives in the singular number, used as nouns, BPANISH. 117

when taken in a general sense, without reference to integérimo, very kenest; celébérimo, very celeeither gender; as-Lo escrito, the vertices, i.e., Lo signeste, the bilineing, i.e., that which is writted.

Lo male, the look, i.e., that which follows. nery free.

Adjoctives and participial adjectives are much oftener placed after the noun to which they belong And such as do not already end in -isino or -derina than before it: as-

Hareber schles, a sole man. Grandin avanzada, estrosced. Purce positios, porticul fara. control.

In many cases it is left entirely to the taste of the writer to place the adjective before or after the noun to which it belongs. But cardinal numbers, adjectives expressing some inherent or peculiar property, habit, or practice of the noun to which they belong, and adjectives employed as particular

epithets with a proper name, are governily placed before the noun? so likewise adjectives accented on the nutepenult; as in these examples :-

The fulco freezum, a planned La timbia oreja, the timbi ecclesa.

Tentre. shep.

Crivalina água, cryskoffin El navicioso Jefkrson, the can-la bluca ndare, the white soor.

La bluca ndare, the white soor. The above rale is liable to many exceptions. Indeed, no certain rules can be given for the position

of adjectives. Attention on the part of the pupil to the practice of the best Cartilion writers will prove the best means of teaching him the most proper arrangement for odjectives.

Tonto, as each; cunnto, so much; mucho, much; todo; all; poco, little, are always placed before the

In some fow cases the some adjective has a different meaning according as it is placed before or after the neue : as-

Chenta cierta, a true (orrinta) Cierta señora, a ceriala lady. COMPARATIVES AND SUPERLATIVES, ETC.

There are some irregular comparatives, as mayor, greater; mojor, better; monor, smaller; peor, morse.

As the superlative relative is formed by placing this article before the comparative, of commoyor means the greatest; ol mojor, the best; ol

menor, the least; el peor, the worst. There ere some irregular superlatives, as máximo, granter: optimo, best; minimo, lean; pésimo, sverst; intimo, lorcet;

serret; infimo, cover.

There are some superintives in -isiac not regularly
formed, as bontsimo, very good; novisimo, very
new; fortisimo, very strong; fidelisimo, very fatikful; suplentisimo, very wise; these being the super-latives of the adjectives beene, meere, fuerte, fiel,

There are o few superistives otherwise irregula

as pauparimo, very poor ; miserimo, very witernide:

brated; salubéreimo, very salubrious; linferimo,

The superlative of the above adjectives can also be formed with seny, as may grande, very great : may pobre, eary poor; uny bueno, sery good, etc.

ean lavo their regular form in -leine, as malishno, very bad ; poquisimo, very swall, etc.

With political or other titles of dienity, some before an adjective expresses somewhat less than

the termination -leime affixed to it; thus, amy ilustre; very illustrious, is less than ilustrisiano, most illus-When a superlative relative follows the noun to

which it refers, it is sufficient that the article be used before the noun, and not repeated before the super-Les Catalanes son les jurchtes The Cutstanz are the most in-zens indza-trioven de Espelin, disstruus propie of Sprin.

Oue noun can be compared with another in the same manner as adjectives; as-

Juan es mes mino que en Jehn is more (e/ a) child thus morto. In forming a comparison, in affirmative scatterers, so is used instead of gwe before an adjective of quantity or number, or before the prenouns what or that which, expressed or understood; us-

Juan tions man do le que sece-alta, John has more them man in sey son as more them ale poure for secole. If the sentence be arguive, do or que may office of them be used before an adjective of quantity or number, or the pronouns sokat or that sokiek ; as-

Hi hijo no tiene man que (or My sen is not more than alz · When the adjective is placed after a proper name as a distinguishing epithet, such as "Tarquin the Prond," the article precedes it in Spanish as in English; ns-

Alexandro el Megno, Alexander Guzzan el Burno, Guzzan the Numeral adjectives of order form an exception to

the above rule : as-Prantiero Primero, Francische Carlos Doco, Charles the

The preposition do is generally used after on adjective or participle which is followed by a noun expressive of the cause, manner, means, or instru-

ment, and also after adjectives denoting distance;

Aginin de Inginto, storp in Bajo de energe, les- én sintere, calellet. ... Botto de prato, bins et the Agenado de médios, catematel ... paretu. La norma. ... de comment de la commentación del sol, inaxed by the Agena de vended, foreign to

Sorlo de un calo, deaf with Ancho de beca, recie in the excess.

**Test! (1. describbal) **
Augusto de manga, narrow in Ventuel, faulte convocato hie

the shore (warn reds net).

The preposition in after a superlative is to be rendered into Spanish by de: a--

Los mas sabies legadores del. The recet ries in the world.

Zanto, and not tan, is used before a noun in comparisons of equality; as-

Maria tiene tanta prudencia. Mary kue as much prodence as como Jurua,

NUMBER OF

The numeral adjectives are divided into cardinal and ordinal. The cardinal numerals express numbers, as, one, two, three; and the ordinal numerals express order or rank, as, first, second, third.

There are also some numeral nouns, such as the collective numbers, una docena, a dozen; una veintena, a score; and the fractional numbers, la mitad. the half : un cuarto, a fourth.

The following is a list of the cardinal and ordinal numeral adjectives :--

ORDINAL NUMB Primero, first. Segundo, scend. Tercero, third. Cuarto, fourth. Quinto, fith. Sexto or sealo, sixth, Septimo, seresth.

ovene or none, ninth.

Noveno or nono, ninta.
Decimo, tenth.
Undecimo, eternth.
Duodecmo, eternth.
Decimo téreto, thirteenth.
Decimo minto, filteenth.
Decimo sesto, sixteenth.
Decimo sento, signiteenth.
Decimo sento, signiteenth.

Déenno nono, mineteenth, Vicesimo, tresutieth,

Vigesimo primo, ticenty first. Vigesimo segundo, tvent

Vigésuno tércio, turnty-third.

Vigésimo emrto, tieraty-fourth. Vigésimo quinto, tuenty-fifth Vigésimo sesto, tuenty-sixth.

Vigésimo séptimo, tienty-

serrath, Vigésimo octavo, twenty-cight Vigésimo nono, twenty-ninth. Trigésimo, thirtieth. Cuadragésimo, fertieth. Quincingesimo, fiftieth. Sexngésimo, sixteth. Sexngésimo, sixteth.

Septungésiano, serentiche Octogramo, contricta

Septimo, erenth. Octavo, eighth.

CARDINAL NUMBERS.

Uno, man, one. Dos, tiro.
Tres, three.
Cuntry, for.
Cuntry, fire.
Sels, sir.
Sels, seren. Ocho, eight. Nucre, nine. Diez, ten. Once, eleren. Doce, tredec, Trose, thirteen. Catorce, fourteen.
Quince, fourteen.
Diez y seis, sixteen.
Diez y siete, serreteen.
Diez y siete, serreteen. Diez y ound, zomeen. Vente, teenty. Veinte y uno,* twenty-oue. Veinte y das, twenty-two.

Veinte y tres, teenty-three, Veinte y custro, twenty-four, Veinte y emeo, twenty-five. Veinte y sels, twenty-sir.

Vehite y siele, firenty-siren. Veinte y ocho, twenty-cight. Yembe y move, twenty-non-Tremta, thaty. Custonia, fata Cineucuta, nfty Resenta, sixty.

Setenta, servaty. Ochenia, englita. Noventa, nearly Ciento, a humical. Decientes, ten hardred. Trecientes, three hundred. Custiocientes, four hundred. Omnercutos, fire hundred,

* Somethees found written as one word, as reintinio, setimblos.

Nonagesino, ninetirth Centesino, hundredth. Docenti anno, two hundredth, Trecentesimo, thick hundredth, Cualragentesimo, four hun-dredth, Quingentesimo, fire handredth.

CARDINAL SUMPLES. Serseicutos, sir Lundod, betseicutos, suce Lundod.

Septembrate attor, even have death. Detectivitishing, 65% 1 1000 Ochoci-ntos, clots Lur in d. unit! Novech ntes, nine hardard.

Nonagentesino, nine Loc. dr. 125 Mil, a thorough Mile stone, the committee

ORDINAL NUMBER . S.

Sex nite slape, els he estrolis

KEY TO EXERCISES.

Ex. 31.-1. This woman is called Mary. 2. It is believed, 3. This wine is sold at three shillings a bottle. 4 You are deceived, 5. What books are used in that school? 5. The bottles will be filled with nater. 7. All the city will be filled with smoke, 8. Here French is spoken. 2. The doors will be opened. 10. The houses are burned. 11. Here books are sold.
12. The propheries are fulfilled. 13. This man is called Peter.

Ex. 25.—1. Aqui se habia el Frances, 2, 1 lanual, y se os abrira. S. Se dobta el clamor. 4. ¿Se u-un pinna s de oro? 5 Las botellas se llenarás de vino. 6. La casa se llenará de limmo, 7. Se abriran las puertas. S. Se cumple la profecia. 6, Las casas se quemaron. 10, Se abrio el libro. 11, Estr vino se vende a dos pesos la botolia. 12, Se centinaara la caria. 13. Se abrieron todas las puerías.

Ex. 30.-1. The father loves his sons. 2. The physician heats the sick. 3. We pardon our debtors. 4. God leaves those who are good. 5. She fears the American. 6. The judge pardoned the man who robbed Peter's father. 7. My manservant slew lils father. S. I pardoned all my deblors. P. Peter loves me like a brother. 10. We will visit the president to-night. 11. I will reward him who honours me.

Ex. 37.—1. Honoramos al juez. 2. Este juez no teme á Dios. 3. Yo perdono á mis dendores. 4. Llamaron á los jántores. 5. El medico sanará á muchos enfermos. 6. Robaron a la muger à quien recompensamos. 7. Honrad à vuestros padres. S. Te amo como á un padre. S. Las señoras recompensario à sus criadas.

COMPARATIVE ANATOMY .- XII. [Continued from p. 60]

MOLLUSCA (continued). GASTROPODA.

THE alimentary canal commences with a mouth armed with hard parts. These are different in different creatures; but in all there is a fibrous plate, bearing teeth, placed on a cushion on the floor of the mouth. These teeth are usually, directed backwards; sometimes the plate in which they are 'set is very long from front to back, the teeth being disposed in small cross rows set in parallel lines from oue end of the plate to the other. This is more especially the case in the carnivorous sea-smails, in which it is associated with a long extensible proboscis. In the land and fresh-water gastropods belonging to the order Pulmonata, the number in a cross direction is very great, but the lingual ribbon is much shorter. This tooth-bearing ribbon is set on a muscular pad. which can move it backward and forward, so that the little flinty teeth act as a fine file. It is curious

that these teeth are composed neither of horn nor shell (CaCO₂), but of silica (SiO₂) or flint. They are, of course, liable to be worn away; but the ribbon is formed from behind as fast as it wears away in front; and in some species a considerable length of it lies coiled up in a sac or pouch, which stretches away from the mouth, ready to supply "the place of the continual wear and tear. A few examples of the pattern of the teeth are given in the engraving (Fig. 28), in which only one transverse row of three different species is given. The meath is very muscular, and has an its front and upper wall a broad horny jaw, which is flat, with a cutting edge ilfreefed downward. It is of various shapes, and is often toothod on its lower odgo. In some sea-snails the month-cavity is furnished with a long trunk, which dun be unfolded from within, and used to graup objects while they are played upon by the file-like tongue. - Inside these trunks there is sometimes a toothed circle or collar of pointed fangs, which very much strengthen the hold that the oreatore has on its prey. It is singular that this tooth-bearing tongue is found universally, not only among the gastropeds, but also among all the higher orders of the Mollnson, so that some classifiers have associated these together as the Odentophora, or tooth-bearers. ,

tooth-bearier, and most of the frosh-water smile above long to the sub-olar Pulmonata, while the sec-smills have gills, and belong to the sub-olar Pulmonata, while the sec-smills have gills, and belong to the object sub-classes. Thus ye's see repeated in the Mollinen the two differents kinds of breathing-vogmis which me suited to aquation and adrial life, and the large of the higher orders. From this we may infer that a gill at the necessary

form of a water-breathing apparatus.

The contral organ, which aids the circulation of the blood, is situated in the typical gastropods in the partition or diaphragm, as it is called, which lies between the breathing-chamber and the chamber containing the viscers. It is always at the hind part of this, mad receives the blood from the gills, or central vessel of the langs, into a chamber or auricle. From this it passes through a valve to the more muscalar ventricle, and is driven by this into , a vessel which almost immediately divides into two. one of which goes forward to the mouth and foot, and the other backward to the liver and all those organs which are situated in the recesses of the shell or hind eavity of the abdomen. The blood, . thins distributed by vessels, is said to escape from them into the general cavity of the body, and thence enters by wide openings to the veins which comey it to the gills or lungs. In the case of the lung breathers it enters the disphragm from behind, and

runs into two main vessels along the margins of this, organ, and then sends of similar vessels or sinuses towards the central vessel. In the Presebyanchiata, the sexes are distinct; but in the Pulmonata and Opiatholiannelsiats the sexes are united in one individual, and the organs in the former are of very complicated and peculiar structure.

The front part of the mantle-fold, which covers in the breathing-chamber, is thickened into a collar, and this is the instrument for secreting the shell. The shape and foldings of this edge of the mantle give zise, in -the process of growth, to all those beautiful shells whose varioty of colours and shape

must be known to the render.

One of the characteristics of the gastropods is
the immonse amount of sticky muons they are constantly exading, withen makes, in the land-sings, a
serious draught on their nutritive system. This is
secreted by glands all over the skin, but also, in
some species, by special larger glands on the back
of the neck:

The nervous ganglia, though they consist of the same elements as in the lamellibranchs, progathered together so as to form a ring round the throat, situated at the narrow part just behind the buccal mass. The muscular system is almost wholly confined to the skin, except that a broad musolo arising from the lower part of the body runs to the head, and slips of this muscular shoot also go up to the tentacles, so that the tubular tentacles and eye-stalks are pulled late the body at the same time as the head is withdrawn. In the common snail the eye-tentucles are the longest, and are set highest on the head, while the lower pair is simply tactile. In many sea-snails there is only one pair of tentacles, the ends of which are feelers, while the eyes are set on the sides or bases of these. The eyes themselves are not highly organised, being little more than a nerve expanded in front of a disc of black pigment, and placed behind a transparent cornen. Enr-saes, with round car-stones in them, are found in many Gastropoda,

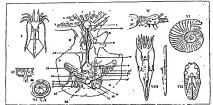
CHPHALOPODA.

This last and highest olass of the Mollasse, differs from the rest in containing animals with far higher powers of locometion and perception than any of the others. The different species are, it is true, often very uncoult and grotesque in appearance, but probably the grotesqueness is due to the fact that

they seldom come under our notice.

The cephalopods are divided into two great divisions, called, according to the number of their gills, Tetrabranchiata and Dibranchiata. To the furner belongs the pearly nautilus, whose shells are so commonly seen in naturalist's shops, but which

belong to all most only two species of aninoals. All
the two characterswhich, in conjunction, illetinguish
the rest of this energe unanorously represented subchasta or fored. The namonalities of the secondary
that at the sides of the neck and a certaint supperiod all give indications that they belong to this



CHILD'S CLASS. H. CARRES VELLARIS OF THE ARM OF A SERVICE, TO THE ARM OF A SERVICE, TO THE ARM OF THE GOALDONE BIRD ON CLASSIAL ARMOUNTED BROWN THE MORNING STREET, VII, THOOF

division, and their variety of form and number— the number of individuals—which lived during that period is truly amazing. It is benfous that, while all the numerous lave shed out, the nautilits, which still exists, represents a genus which lived in the primary ugos, long before the others came into existence It is probable that mu other genus, and certainly none so high in the animal scale, has hull so prolonged un existence on our planet.

VERTEBRATA.

The comparathely young study of embryology has already effected many changes in the classification of unituals, but none more remarkable than the revolution it has effected in our idea of the contents of the group Vertebrata The sen-squirts and their allies, the floating Salpse and the beautiful Pyrosoma, in fact all the Ascidians or Tanleutes. are shown to have laid at some stage of their

indeed speak of the group as Chordata, and dividethem into:-

I. Cephaloehordata for .1 mphioens, when the notochord extends into the unterior end of the

body (sepand).

II. I rechordata for Tunicates, when the note-chord is found only in the tall (obja). III. Vertebrata, when the notochord becomes rrounded by vertobral ring».

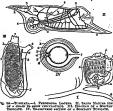
We will commence by the description of a simple animal, such as may be found adhering to the under side of a rock near low-water mark. The unter form. is that of an Eastern leathern bettle, with a prominent mouth at one end: but it is unlike this but lo in that it has another opening on the side a little below the mouth. The mouth leads into a wide dilited throat, which occupies a large part of the

centre of the bag-like animal, and is of a very peculiar structure. It has in its walls a series of slits which lead into a cavity directly communicating with the lower orifice. The slits are very numerous and small, and their edges are fringed

with cilia which continually drive the water from the central threat to the atrial ohnmher, as the cavity, is called. At the top of the threat is a circlet of tenlacles which protrude juto it, while at the bottom is an opening leading by a short disophagus into a stouach, from which an · intestine, twisted a few times, leads into the atrial chamber near its orifice. The remainder of the viscora, consisting of liver, beart, etc., are closely united with the stemuch at the bottom part of the sno. From one end of the heart n vessed rons off, and is continued as a conacious channel along one side of the sac-like throat, while another channel along the opposite side runs to the viscers, and through them to the other end of the The two channels above-menheart. · tiqued communicate with one another by many transverse vessels, which branch in the membraneus walls of the sac. Let us now consider the relation of these organs ; to the functions of respiration and nlimentation. First, with regard to respiration. The cilia which fringe the slits are the prime movers of the water, by driving it from the inner sie into the chamber which surrounds it. This motion necessitates that a current should set in at the mouth, or end opening, and another suf at the anal or side

to the inner, or what may now be called the respiratory, sac. . In the substance of this sac the blood is constantly changed by the motive power of the heart, which, though a simple tubular organ, con-tracts at one end first, and by the successive contraction of its circular fibres drives the blood to one of the channels, and thence through the tissue of the sac into the other, and so, by way of the viscera, into its other end. It is peculiar to these animals that the current is occasionally reve After working in one direction for some time the heart remains at rest, and then begins to propel the blood in the other direction. Next, in relation to food, it will be seen that the current will bring with it many of those little creatures which are so numerous in the waters of the sen. By some mysterious action, the cilia do not allow these particles of food to pass out by the slits, but propel them down towards the entrance to the stomach,

121 and so onward. The excrement is, of course, passed out at the simi opening by the current. When mry. of water, it is felt by the tentacles which hang



opening, and thus fresh water is constantly brought . down inside the throat, and when this is the case the animal contracts the outer niuscular coat so foreibly as to compress not only the atrial clamb but also the respiratory sao, and so drives the water and the substance out again. This notion has procured for the simple unicate the name of the Son Sonirt.

Compound Tunicates do not differ much in structure from the simple energbut they are connected togethor in some instances by a stalk, through which the blood is driven from zoold to zoold. This is the case in the family of the Clavellinides. In the family called Betryllide the separate zookle are only the products of a budding process, and though they are at first connected organically and always cohere, yet, when mature, the vascular connection: is obliterated, and each feeds and respires for itself. In another family a multitude of goolds are united in a tube, one end of which is closed and the other open. All the mouths, or in-current oriflors, of

these are outside the tube, and all the ex-current orifices inside, so that the current of water which passes into the tube, being compelled to pass out at one end, drives the whole animal along; these · creatures differing from the foregoing families in being free and locomotive. Another free and · locomotive family is characterised by what is called an alternation of generations. In these a solitary individual gives birth by budding to a whole chain of zooids unlike itself, and united to one another end to end, not, indeed, organically, but by simple attachment. These have their in-'current orifices at one end, with a valve attached to them, so as to prevent the water escaping outward. When, therefore, the body is contracted, the water . is driven out at the other end, and so contributes to the onward motion of the chain. Across the respiratory sac there is a band or ribbon stretched, · and this is the main instrument of respiration. One of these creatures (i.e., one link of the chain) is represented in the engraving (Fig. 30, 111.). Each zoofd, or link, gives birth to one solitary form, unlike itself but like its mother, and so the so-called alternation of generations is completed. The production of the solltary Salpa is a true reproductive process corresponding to the rearing of a plant from seed, but the production of the chain is analogous to the growth of a branch from a leafbnd.

VERTEBRATA.

The Vertebrata are an extensive series of animals, which, though occupying earth, air, and water, and possessing wide differences in their general form, habits, and degree of intelligence, have yet certain characters in common by which the naturalist is enabled to classify thom. On the very boundary line of the two divisions there is a little being which forms the connecting link between them, by partaking of the characters of both: this is the lancelet (Amphioxus lanccolatus), so named from its lanccolate form. It is found in the European seas, especially the Mediterranean. Its respiratory or breathing apparatus is not unlike that of an ascidian; but it has a rudimentary spine and a spinal marrow, which are decidedly vertebrate. It is this spine or · backbone which constitutes the principal feature in the basis of classification. Every animal in possession of a spine, however rudimentary or imperfect, must belong to this great division of Vertebrata. In proportion as the spine is found developed, so will be the other bones which complete the skeleton. Independently of these two characters, the Vertebrata are distinguished by a more highly organised breathing and circulatory apparatus. They possess a heart, and have red · blood; they have a brain and spinal marrow; and

a corresponding increase in the development of the emanating nerves. They are provided with sensory organs, such as those of hearing, sight, smell, taste, and touch. The anatomy of these several structures, will be heielly reviewed under the respective subdivisions of the Vertebrata.

This grand division is subdivided into five great classes:—Fishes, Amphibia, Reptiles, Birds, and Mammals

FISHES.

In accordance with the plan previously followed. we must begin our description with that class which presents the lowest organisation-namely, fishes. They are the most extensively distributed throughout the globe, and the most numerous and prolificof the whole division. Wherever water abounds, in the familiar pond, or in the rippling stream of a narrow brook, in lake or river, sea or ocean, there are floating tenants possessing an almost infinite variety of shape and size, from the little minnow to the huge shark. Man, the other extreme of the vertebrate kingdom, able to explore the waters at will as he boholds the pond or lake whose gentle surface is searcely ruffled, or the rugged waves of the mightydoep tossed to and fro in mountain masses, has begun to form some conception of the vast numbers. of living beings situated beneath, listlessly enduring the one, or revelling delighted in the other. Thegreat Pacific, with the lesser ocean the Atlantic, had been traversed by a living chain ages before adventurous and enterprising man first thought of connecting shore to shore by means of a submarine electric cable.

The student mayform a bare idea of their numbers, when informed that in the herring fishery off Lowestoft, in 1854, nineteen millions were caught in that:

single season.

It will naturally be surmised from the circumstance of fishes being destined to live in so dense a medium as water, that their structure will indicate an especial adaptation to this kind of life. Their observed the shape which offers the learn resistance to the opposing flath, being smooth, more or less to be supposing flath, being smooth, more or less towards either extremity. They have no neek, the head joining the trunk immediately.

The body is nearly of the same specific weights as the fluid in which it is Immersed. Forming an oranamental protective covering to the parface of the body are numerous scales attached to-folds of the skin, and overlapping each other by their free, margins, like this on the roof of the skin. These margins are the second of the skin of and also of consistence, from a men manbring to a strong bony plate. Some fashes have no scales. Fishes generally move by means of fins, which serve the place of limbs in higher animals. The two anterior and posterior correspond respectively to the forc and hind limbs. The auterior pair along its whole length. It is compared, not of one single piece, but of a number of segments connected, together by means of a fibrons material. Each segment is made up of a number of parts.

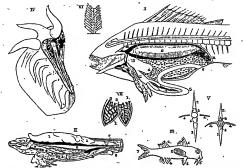


Fig. 51.— Diagram of the stygram abanchism of the Vegera of a Fig. 11. Diagram of arbanchism of the Vegera of A Herrico. 11. Diagram showing the Fig. of a Fig. (apter Scot) IV. Diagram showing to the primerosic law position of the Upper Levin, and the includings position of the Lower Term in 7th Law the Company of th

Ref. to Nes. in Fig. -1., It. 1, ovary; 2, art-bladder; 3, excephages or gallet; 4, stomach. 4', pyloric orea; 1.6, further is, 6' in the standard of the standard or in the standar

are called the pecional fins. They are invariably saturated on the briesant, immediately behind the gills. Those sistancted on the belty are called 'ventral fins. The single fins are the downst (Fig. 84, TII.4.), at The single fins are the downst (Fig. 84, TII.4.), at The single fins are the downst (Fig. 84, TII.4.), at The single fins are supported by finaments of more or less power are supported by finaments of more or less power and flexibility. The fins differ in their number and size, and also in the nature of the pays or finaments which support them. The pectoral or ventral, or both, may be absent; or there may be no fins at our both, may be absent; or there may be no fins at our both, may be absent; or there may be no fins at our both of the contral of the final
All fishes possess a more or less perfect skeleton, the chief element of which is the vertebral column. This occupies the axis of the body, and extends

The central piece (Fig. 37, V., 1)s named the body. It is shaped like an hour-glass, with the two extremities hollowed out into conical cavities, which sometimes communicate. Several processes project from the body. Above and below there are two small processes (6, 6), which soon unite together, enclosing pixh-shaped spaces; afterwards continuing ownards as single processes. These are named respectively the upper and lower spinous processes. The upper areful lodges a portion of the spinal results of the property of the contraction of the c

leverage in producing the requisite rootements in

locomotion.

There are other little bones which spring from the ribs and vertebre—oftee very numeroes, as in the herring.

ELEMENTARY POLITICS.—I. INTRODUCTION—THE STATE—DIFFERENT FORMS OF GOVERNMENTS.

OF GOTHELSHATTS.

What allowe to home a great data ideas the political and the second of the political and the political and the political and the political stage forms equiums apon them. More data to form equiums apon them. More man hashand, and one pan is a healing them. Every man in England, expert to law it. Wessent cussed the may be provided in the product of the product of the political and the first feet of the product of the political and the product works and the product of their fathers, brothers, hashands, recenthers, for the product of their fathers, brothers, hashands, recenthers, for the product of their fathers, brothers, hashands, recenthers, for the product of their fathers, brothers, hashands, recenthers, for the product of their fathers, brothers, hashands, recenthers, for the product of their fathers, brothers, hashands, recenthers, for the product of their parties for the product of their parties for the product of their parties. The product of their parties for the product of the parties and the majoritary in parties — the product for parties and the majoritary in parties — the parti

opportunity to obtain.

Now, any sort of discussion on political topics usually before long implies some reference to general principles. If we are discussing, for instance, the question of forther restrictions on the liquor truffle, we shull probably ask, For whose saku is it proposed to restrict the sale of liquor: for the sake of the people who drink too much, or of the other people who are annoyed and injured in various ways by the tetrible cvils of drunks If the former, is it the bosiness of the Government to look after grown men, who ought to be able to look after themselves? If the latter, how much annoy.mce does it take to justify interference! Both these alternatives raise a very important and very large general question—the proper relation of the Government to the iodividual and like rights. Or If we discuss the question of a closer union between the Governments of the British Colonics and that of Great Britain and Irekund, usually called " the Federation of the Bospire," the question at once arises. What ore the general characteristics of the Federations we know, and can we apply them

to the proposed unioo?

Many persons, again, hope that file Government
will some day own all land and machinery, and
direct all production. Some of them propose that

the Government shall obtain it gradually, by putflogoo n high "succession duty" in the death of his present orners. Of course the objection is usude, But this would interfece with the right of bequest, which is one of the "rights of property" i surely is a man, having scoplared property, may chiim to leave

is to his reduction or friends.

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observation of history.

Our first question, then, may be, What do we understand by a State! And the best way of dealing with it will be to explain briefly low States have arisen in history.

The enrifect form of scelety with which we need

here concern ourselves is the village community (see lessons in Political Economy, Vol. VII., p. 209), a collection of hon-cholds either related ar supposed to be related by descent, cultivating land which is partly common property. it Is true there are much more rudimentary forms of society, but their relation to the village community, the hon-chold and one another, is very ob-ome, and it is out of the Mingo community that the State, properly speaking, arises. suppose ourselves transported back through the ages to some village in early India. Wu shall find that it is usually governed by a Council of Elders, but he and giving special orders (for the enomencement of hervesting, for historice) and judging offenders, they have very little to do; for the life of the village is really regulated by the customs which have come down from por-They have grown up gradually, perhaps are still growing, but the growth is not perceptible. Genurally, the people of the villages are part of a tribe, and as such they go out to war and serve under their cluef. War tends to strengthon the power of the chief; he gets a special share of any booty or conquered land; the warners, in particular, sopport him; he extends his dominion; and so gradually utilitary kingdoms grow up. . But these kingdoms are not States, for this reason, that there is no regular legislative authority in them. The

chiefs do not make hwy. They issue opeind commands 'to thick subjects, and deemed services of them-contributions in: usen and money; but otherwise they let them show. They do not propose, chief the subject of the subject of the subject of the third varieties of contributions. The subjects on their next, worship, their own gods, usually without renditions of the subject of the subject of the radiation of the subject of the subject of the radiation of the subject of the subject of the radiation of the subject o

But in a few parts of the world a further develop-ment took place. Many tribes have hill-forts— temporary refuges for themselves and their cattle. should a stronger tribe ravage their country. We may, see remains of such forts on some hill-tops in parts of England. In parts of Greece and in Southern Italy, these hill-forts became to some extent permanent abodes. Partly in Greece the change was connected with the introduction of new for as of worship which involved permanent temples, images, and other sacred objects; and these, of course, had to be kept out of the way of the enemy, because (the image being often confounded with the god) if they carried off the image, they would have the god too, and could doubtless induce him to favour them. Then the class specially charged with keeping up the worship went and lived near the temple. Moreover, Greece, in particular, is very mountainous; there is abundant building-stone everywhere, and a hill can generally be found which is tolerably defensible, and yet has a spring of water somewhere near its summit, becouse higher hills are not far off. So, instead of the village, with its slight buildings and shifting oultivation, we get a permanent city, able to stond a siego. And the country being much out up by mountains, and no-where very rich, it was not, like Egypt and Assyria. open to conquest. Great migrations there were in it, but these served rather to produce mixture of national types and to advance civilisation.

representation of the management of the manageme

that in very early times the ruling aristocracies of Greece were physically and intellectually the best part of society. As wealth grew up, other people obtained the means and the leisure to rise to an equality with the old citizens; then, too, the little wars in which these States are constantly engaged bring about a demand among the mass of the free population for a share of political power; so we reach democracy, the rule of the people in general. These democracies were all confined to single cities with a total population varying from 2,000 or so to 400,000. They are marked by intenso patriotism, combined unfortunately with bitter party spirit and personal hatred, which very frequently overpowered patriotic feeling. In all cases there was extreme jealousy of allowing power to any single person, and the bitterness of feeling between classes was so great that the States were nlmost always on the verge of revolution, and many of them constantly undergoing it. It was only when these little cities lost their political importnnee-when the great military monarchies of Philip of Macedon and his successors orose, which kept them quiet and practically held them in subjection-that they became comparatively tranquil. must not, however, imagine that in these olties anything like the whole of the adult male population had any part in the government. Not only wore there many slaves (in Atheus, about 415 B.C., four or five times as many as the citizens), but many foreign residents. The journeymen artisans were mostly slaves; the foreign residents had nearly all rotail trade in their hands. In Italy, however, one great city State, after

passing through much the same order of constitu-tions as the Greek States described above, subjugated not only those States, but the rest of e civilised and much of the uncivilised world. But also did not incorporate these communities with herself, though she gronted individual mer bers of thom membership of her own civic body, and sometimes did so to all the members of some one of them (Tarsus, the city of St. Paul, is a famillar instance). Her own political organisation was no longer adequate to govern her empire. Under republican forms, therefore, a single ruler was appointed, and though these forms were always more or less kopt up, the office practically became hereditary, though the succession was very frequently interrupted. In theory, at the beginning of the Christian Era, the Roman Empire was primarily a collection of cities and their territory, Rome being the presiding city among them. Some of these s hod-certain permanent rights of self-government, others governed themselves with a greater or less degree of liability to interference from the

provincinal governors sent out by Rone. Much of the territory helic by Rone was regarded as too barbarous to be yet organised into self-governing communities, but cities were gradually founded in it. And the government of the whole body was exted in theory in the Roman people volting as one body (though soon after the Empire began this body cented to uncel), a senatfor select council of them, practically appointed by the Emperor, and the Emperor himself, whose powers were firturally the control of
But the local governments for various reasons gradually became weakword, and the Baspero, with his trained staff of olvil servants (the like, of which had never existed before), get more and more control over them. So that about five centuries after Christ we find that the Roman Empire is conserved of an one great State with one personal ruter, on whom the people have conferred the article, on whom the people have conferred the about the people have conferred the about the people have conferred the conferred the people of the pe

Now the Roman Empire fell-for many reasons : chief among them because it was invaded by more vigorous peoples, and because, being impoverished by a had system of taxation, it had not the resources to resist them. These people (in the West) were organised very much as the earliest Greeks had been, and as the Macedonians were before they conquered Greece, in semi-feudal military monarchies. These had originally been organised in clans, some of which were supposed to he noblor than others, and in each of which there were several grades in rank, and a marked distinction between noble and non-noble families; and each clan had a hereditary chief who generally led it in war. But as clans and the tribes which composed them got more into the habit of combining for war, they took to electing regular leaders; and as the successful leader got special privileges and a special share of the booty and land cantured, he gradually became wealthier than the rest of the people, and rose above them. Then his special friends or "companions" in war (known in the history of our own forefathers as acsiths) acquired a certain procedence from association with him and participation in his victories, and he rewarded them with grants of land and posts of honour in his household. And his leadership gradually became hereditary, and of course the more war there was the more the power of the commander-in-chief was strengthened. Moreover, as his dominions increased, he granted out parts of it to his "companions" to rule on condition of - doms.

agknowledging their subjection to him, or 'doing agknowledging their subjection to him, or 'doing sowrion,' and sometimes no doubt, neighboiring potentates who were not so strong staved off a war' by necepting the same position. This holding of, land on condition of service is the 'essence of leadhlism; it is partly besed on the land tenur of the primitive village community (see lessons in Political Economy, Vol. VII., p. 209), and partly on-practices known to Boman law. These neuberlimites revealed the control of the productive of the productive from the same cauched 'frendricter's) made similar a regular gradulon throughout a found State from the kine to the brick of manor.

. Now this king was not despotio by any means. His feudatories had a great deal to say to his action. Indeed, he consulted some of them-the "wise men" of the nation-on all important steps; and the centrol of the action of the king and his "elders" or "wise men" ultimately rested with the assembly of all free men of the nation. But as most of these could not attend the assembly rogularly, its control gradually declined. Moroover, his chief business was not to legislate or to carry out administration, but to conduct wars, and to judge or arbitrato between his subjects, more particularly his most powerful vassals. Moreover, by tradition, he could only tax his subjects with their express consent. In most Continental countries a ensfor grew up of calling together representatives of different classes of these subjectsthe "Estates of the Realm," that is, the nobles, the clergy, and the commons-to grant supplies of money and deliberate on matters of importance. But these were generally summoned only when the king found it convenient. In England, when the misgovernment of Honry III, drove the nation to revolt, Simon de Montfort summoned the first Parliament, practically as a check on the king, and it soon divided into two Houses and sat more regularly than most Continental Parliaments. clergy, too, refired from it to assemblies of their own, which survive in the "Convocations" of the provinces of Canterbury and York. Unlike the -Continental assemblies, there was no sharp division into estates, because the bishops sat amonest the lords, and there was not (as on the Continent) a distinct order of nobility: the younger children of a peer are commoners. Indeed, the distinction of "estates" was so soon lost in England that men came to think (as some still think) that "the three Estates of the Realm" were King, Lords, and Commons. Moreover, there is much greater continuity between this Parliament and the earlier. "assembly of wise men and "assembly of freemen" than is traceable in most Continental king-

We find then that the old fendal monarchy in which the power of the king was limited by that of his chief vassals passes into the monarchy with estates or orders limiting the power of the crown, and with some form of representative government, But now (at any rate in England, France, Spain. and Scandinavia), another change took place. The kmgs strengthened their power at the expense of the nobles. In England this process was to a creat extent brought about by the Wars of the Roses, in which many of the old noble families were extinguished. Moreover, lawyers had from onite early times applied to all kings doctrines that they found in the Roman law-books about the nowers of the "Prince" or First Citizen, which was the chief title by which the Roman Emperor was known in Rome Itself. So we find it held that "what the Prince decides on has the force of law, because the people have transferred their power to him," and "all the land of the nation ultimately belongs to the Prince; the people have surrendered it to him and received it back as a sort of tenants." In Italy, too, writers like Mucchiavelli familiarised the world with the notion that the ruler, simply in his own interest, might so organise the people through his officials as to merease its wealth and power to pay taxes, and so camble him to provail over other States. Moreover, the attributes of the Kings of Israel and Judah were ascribed by ecclesiastics to the kings of their duy. One result of all this was the patriarchal theory of monarchy, which the Tudors and Stuarts attempted to carry out in England, and which was successfully put into practice in France, Spain, and some States of Germany. According to this all power was vested in the person at the head of the State, and he was bound to treat his subjects as a father treats his infant childrenproviding for their good without reference to their Jikes and dislikes. This theory in many Continental countries lasted on into the present century, and though in all of them except Russia the people have a very considerable share in the government, the view usually taken is, that the people have tacitly ceded their powers to the king, who has granted some of them back again, defining the grant and the way the powers are to be exercised in a written constitution. Several kings of European States granted constitutions after the overthrow of Napoleon in 1814, and revoked them a few years afterwards, but they have since been restored

In England, patriarchal monarchy, which was never quite established, received its death-blow when Jumes II. fled to France. The theory of "an original contract between king and people,"

which historically had not much more basis than the patriarchal theory was applied to justify his deposition. The propie, it was said, had contracted together to set up a Government to protect their live, liberty, and property; and had contracted with the king, the head of the Government, to carry out their purposes. If he imprisoned or taxed them without due cause, he broke his contract and they might turn him out. So the throne was declared vacant, and offered by Parliament to William of Orange, and the succession afterwards settled by Act of Parliament on the descendants of Sophia. granddaughter of James I., who had married the Elector (or reigning Prince) of Hanover, so that our present Royal Family hold their position by Act of Parliament.

To the patrimebal monarchy just described we owe some of the leading fentures in our idea of the State. We conceive the State as a body of persons living on one territory-generally of considerable extent-and raicd over by a supreme authority (technically eniled the Sovereign), whose commands each member of the body is bound to obey. But we regard the supreme authority as consisting not of one individual, but of one or several groups of people, and we conceive that they derive their authority from the will of the bulk of the male adult population, or, at any rate, that they rule with its consent, whother formally expressed of tacitly understood. Here, the "social contract" theory has affected our views. And we regard it as carrying on its work by means of trained officials (technically called a bureaucracy), appointed by the head of the executive power, and as governing according to certain principles either expressed in the laws or generally understood. (Indeed, Sir. Henry Mnine has said with a good deal of truth that a modern democracy is very like a last-century monarchy unside down there is the same sort of administration through trained officials, only the power of the machine is supposed to come from the people instead of the king. This, however, onite overlooks local government.) We shall return to these conceptions later. Here we may notice that they are all to be found in germ in the theories of the Roman lawyers before mentioned. The notion of the Sovereign is, to a great extent, derived from the absolute monarchies we have described. The first modern civil service was that of these monarchies; the notions of the multiple character of the Sovereign and of the constitution are partly suggested by English history, partly by the theories of a social contract, to which we have referred. We must, however, here notice the growth of popular government, or democracy.

When the English colonies in America separated

from England, they established Republican governments, which may be concisely described as governments in which the power was ultimately derived from the bulk of the male population, and the members of the Government were elected by them for short terms. In structure these are very like the English constitutional monarchy, with written stitutions, and with electivo heads substituted for kines. Shortly after the conclusion of the war, these joined together into a federal union, with a central Government, to which each State transferred certain of its powers (such as that of deciding on war, coining money, and levying customs duties), retalning the rest. These institutions were really derived, to a great extent, from England, modified, however, by the "social contract" theory and notions derived from the study of the democracies and of the one great federal union of antiquity, the Achean League. In all cases they closely resembled the English constitution of that time, with an elective head put in the place of the hereditary king, and two honses of the legislature, both, however, elected by the people. But the suffrage was not by any moons "manhood suffrage," but was dependent on a rather high property qualification and some length of residence. Impressed with a doctrine derived from the study of the English constitution—that the three great powers of government, the Legislative, the Excentive, and the Judicui (that of law-making, that of carrying out the jaws, and that of judging when the laws have been broken and, as far as p setting matters right again) should be confided to different sets of porsons, as far as possible, and that one set should keep the other in check. Moreover, mmy of them were strongly impressed by their Puriton training with a belief in the natural deprayity of man. So they contrived elaborate devices to hunt mid regulate the action of the various departments of government; and this system of "elecks and balances" still marks the Constitution of the United States.

England at the out of it the last century was helds up to Commend minous by writers on political up to Commend minous by writers on political ments. Though this was far from being the case and the comparison with all other great and another the comparison with all other great the comparison of the comparison with all other great the comparison of the c

Napoleon, therefore, attempts were made to copy the oblief features of the Constitution of Ragland in various Buropean countries; and its may be said that every existing momenthent constitution of Western Europe, and the present Constitution of Western Europe, and the present Constitution of Republican Faince, owes he leading features to the Diritish Constitution.

One leading feature of this century, then, has

generally been the introduction of constitutional marchy. Another has been the general tendency towards the strengthening of the popular element in that monarchy; the must of the people have gained very much in power, relatively to the rest of the State, in the last forty years, as the middle chases generally did in the thirty or forty years prerious. Still another feature-far more important on the Continent than in England—has been the idea of nationality, which, as we usually find it, takes the form that all the people who speak one language are of one race, and ought to form one State. This iden dates from about the beginning of this century. It is to a great extent the product of the scientific study of language and history, which hardly began before that time ; and it has been often applied mistakenly-for very frequently contiguous peopleof different ruces have come to speak the same language, and, though they have partially no doubt Intermarried, have not by any means blended into one race. Many of the people in Eastern Prussla, though they speak German, me Slavonic by descent. But a common language implies a common literature, and that involves community of ideas, and a much greater likeness in character and spirit than would otherwise he possible. The two great nations which invo been nuited under one Government in this century are Germany and Italy. In each case the desire for political union has been kept up by the fact of there being one common language and literature.

It must be remembered, however, that there may be "metione" with a arring uniform finding but on "metione" with a arring uniform finding but on "metione" with a arring uniform finding but on the property of
Londres

as they are in a school. That this may be possible - In witness whereof we have set our hands and there must be much intercourse, and for this a seals: common language is all but indispensable.

α.s. . . . (L. S.) & Co.

49.- FORM OF FRENCH CHARTE-PARTIE. . COMMERCIAL CORRESPOND-Je soussigné . . , demeurant à . . .

[Continued from p. 78.] 48.—FORM OF ENGLISH CHARTER-PARTY.*

ENCE.-IX. London It is this day mutually agreed between . . .

master of the good ship of of the measurement of . . . tons or thereaboats, now lying in the harbour of . . . and . . . & Co. of . . . merchants; that the said ship being tight, stooneh, and etteng, and provided with a sufficient number of mariners, and overy way fitted for the voyage, shall sail with the first fair wind and weather that shall happen after

ares mar wind and weather those shall happen after the . . . act, from the said port of . with the goods and merchandise of the said . . & Co. their factors and assigns, on board, to the port of . . and there unlade and dis-charge the said goods and merchandise (the said ship shall then proceed forthwith to the port of . . . or os near thereto'ns she moy safely get, and those take on board a cargo of . the property of the said . . . & Co., their factors and assigns, and shall there return to the port of with the said cargo) in the space of . . . months, limited for the end of the said voyoge, the act of God, the Queen's enemies, fire, and all and every other dangers and accidents of the sens, rivers, and anvigation of whatever nature and kind seever excepted. In consideration whereof the said & Co. for themselves, their executors, and administrators, do hereby covenant and ogree well and truly to pay

or cause to be paid unto the said . . . his executors, administrators, factors, or essigns, for the freight of the said ship and goods the sum of on the delivery of the first cargo in the port of w and the remainleg half la cash days after the unleading and right

days after the unleading and right delivery of the aforesaid earge of . in the port of .), and also shall and will pay for demurrage, if the said demurrage shall be by the default of the said . . . & Co., the sum of per day.

* The student will note the difference between the English and French and German forms of the Charter-porty. The latter are not more translations of the former, . 177

capitaine et maitro après Dieu, du bâtiment nommé . . . de . . . du port de . tonneaax ou envirou, actuellement à . . . étanohé, gréé, équipé, et en état de naviguer, reconnals avoir frété mon susdit bâtiment à vous Monsieur aussi soussigné, négociont, domeurant à . . pour me rendre luccessamment pour me rendre incessamment domenrant à . . pour me rondre incessamment avec mon susdit bâtiment à . . . et y recevoir marchandises énoncées, par votre signoture, pour, après avoir roçu mes expéditions définitives de la douone, et signé mes connaissements, et du premier temps convenable, partir, Dien nidant, pour me roodre en droite route à . . . liou de ma destination ot décharge ot après mon heurouse orrivée on dit lieu, et avoir livré fidèlement les mm-

chandises do mon chargement aux correspondants de l'affrétear, ou aux porteurs des counaissements (sauf les risques, perils et fortunes de la mer, dont Dieu nous garde), il me sere per eux payé comptant, ou au porteur de mes ordres, au lieu de ma déclarge, pour mon fret, en espèces sonuantes, et non natreurent, la somme de fronce et france de chapeau par chaque tonneau composé de mille kilogrammes.

Le capitaine sera libre de charger 4 hord de son navire pour compte de son ormoteur, saas que pour cela l'affréteur puisse lui donner moins da . . . kilogrammes ci-dessus spécifiés, s'ils lui sont nécessaires.

J'accordo . . . jours couronts de planche pour mon chargement, et . . . jours couronts pour mon déchargement .

pour mon déchargement.

Co délai cipiré, il me sora payé, en espèces
sonnantes, la sonime de france par jour
de retard, et ce, jour par jour, soit pour obarger,
soit pour décharger. Les avaries grosses (dont Dien nous gardo) seroot réglées et poyées suivant les us et contomes do la mor, au lieu de ma déchorge. Tous les frais et droits relatifs à la cargaison seront supportés par le sienr . . . affréteur et consignataire; et ceux concernant le navire, par moi, capitaine. La cargaison sera mise à bord, et repriso de mémo oux frais et risques du sieur affréteur et consignataire.

Poar l'accomplissement-des présentes clauses et conditions d'affrètement, les parties contractantes

engagent mutuellement tons leurs blens présents et futurs, spécialement le sieur affréteur, la eurgaison à charger ; et le capitaine, son mavire, agrès et apparaux.

Aux susdites conventions, moi . . . affréteur soussigné, le promets de faire effectuer le chargement et déchargement sus-mentionné.

Fait et signé de bonne foi, sous les «cings des parties et celui du contrier ver- qui le présent original reste déposé, pour en délivrer expédition d qui de droit le treixe mil

Courtier juré.

50.—FORM OF GERMAN CHARTE-PARTIE. 6 barter Bartie

gefchessen turch Bermittelung griffen in geriffen dere als Bespachter einerseilt, unt Carptelun führend des gerf als Berssachter andererseilts auf satzute Bernszungen :

1. Garbatan (fries readined 404ff) un welltommen fedingingen Staatt, ju tre belimmen Arcit vollhöterig ausgerüßet und bezanne, und mit gefreign Battern verfeien zur feien und alenaigen Direktifeten in der der Befraghere (jur Kaglitt und ben nichtigen Gamel für ist Geschaus und jur Erneduum; ter Saue, Gegel und Geschlichterien Angeseinenten) und zur ein fille Rinnand anzeite, dem Juffinnung de felfen, einigt Gelter fahren, des Kernfelt in Taget al fen. den.

2. D herr Befrachter verpflichte fich tagegen, tas befagte Schiff er Gagitain fogleich nach erhaltener Abfertigung nut erftem ginfingen Winter und Wetter

3. Nag, Gett gete, gindlicher Antunft am Löfichelage und nach guter und getreuer Lieferung ter Laung (jedech hoffet ber Applian für feinr Seeglaufe nach Seefdaden), d Gerr Orkachter verbunten, tent Copitain obtr an bessen

Ortre de ftepulirie Fracht . prempi und unweigetlich zu bezahlen. Im Ball einer Kennie Gytracertinaire volrd bieselb nach Ge-Ellainer regulirt und getragen. 4. "Tage jestagtebt, welche

an Bere geleacht und . wieter festenfrei abgebet, progogen terfelde fem Schiff an fehörige Platze legen muß, wie tu Lufe tel Woffres es erfandt; etwaige Schiherfosten sum für Rechnung te Herr Bestandter. Das Garnier liesen ter Capitain. 6. Streige Zehiffentleffen in (Araric delle ausgerenmen) rerten bem Gertiam & Gente ber dracht fanne Bemmusien unt Zinfen gegen Bezehlung ber Affennramfrefen von Gerr Befrachter Gerrefrententen verneibeiste.

7. Der Caritain geidenet bie Cennessenente in Bejug auf bie Grade fie fie dem vergeligt weren, eine werer Berbrit nes. Radefielt von beiere Bante-Bartle zu beben und baleten ble etwaige Mebr- eber Bantesfant inr Redunnig te Gerr Beitradete

S. In ten Sollefagen wirt tie Latung tirreb t Gert Befradber, unt tas Schiff ten tem Capitain elatirt unt verfollt.

vergout. Gir tie getrene Grintlung tiefer Charte. Bartie vervflichen fich beiterfeitige Centrabenten mit ibere Sabe und Gibten, unbefentere fielt ter Capitain fein Zobiff mit Jubefter, femie ber Befrachter tie gange Latung jum Blante.

Ben tiefer Charte. Partie . . . ausgesertigt unt wen ten Contrabenten rigenhantig unterschrieben. So gescheben

51.—ORDER FOR PAYMENT AT SIGHT.
5.000 Frs. Margeilles, May 15th, 1808.

At sight, pay to M. Chartier or order, the sum of Five Thousand Francs, as per advice of LOUIS LUMAIRE.

Mr. Perrin, Merchant, Paris.

Bon pour Frs. 5,000.

Marseille, le 15 mai, 1898.
À vue, payez à M. Chartier, on à son ordre, le somme de Cinq Mille Francs, valeur reçue, que vous passerez suivant l'avis de

Louis Lemaire. A M. Perrin, negociant à Paris.

Marfeiller, In. Mai, 1808. Bei Sicht gobien Sie an heren Chartier eter Orter bir Summe von funftaufend Granten, faut Niele von R. 5.000.

Seren Raufmann Berein, Baris.

52.—LETTER ENCLOSING INVOICE OF GOODS.
Gentlemen,—We beg leave to advise you of our
having forwarded the goods ordered as follows:—
M....ewt...lb. gross weight,....which
please to receive crediting as as per invoice here
enclosed for the amount of(clc.)...

For balancing this sum we have drawn on you at month date to the order of which please to accept.

Hoping that the goods sent will be to your full satisfaction, and trusting to be favoured with your further orders,

We are, Gentlemen, Respectfully yours. Messicurs.—Nous avons de plaisir de vous faire part de l'empédition des articles que vous avez bien youly nous commander, savoir :

Pour balance desdits objets nous avons dispose sur vous à mols de date à l'ordre de nuquei il vous plaim de préparer bon accueil.

Esperant que notre envoi sera à votre entière satisfaction et vous priant de nous continuer vos commandes,

Nous avous l'honneur d'être, Messieurs, Vos obéissants Serviteurs,

Sechachtungeroll.

53.—FORM OF ENGLISH BOTTOMRY BOND.

entaegen unt geichnen.

Know all men by these presents that I manetor of the ship or versel called the ef and belonging to the port of am meld and firmly bounden unto . of the bed and firmly bounden unto . of the town of Kingston-upon-Hull, merchant, in the sum of . of lawful money of Great Bread of . of lawful money of Great Bread with a six executors, administrators, or assigns, or his or the lawful attorney or attorneys, for which payment to the be well and truly made I bind myself, my held myself, and effects finnly by these overestly, and administrators, goods, chattels, and effects finnly by these overestly.

Dated at Kingston-upon-Hull aforesaid this . . . day of . . . in the year of our Lord . . .

And whereas the above-named . . . merchant, hath advanced and lent unto the said . . . the

sum of . . . to enable him, the said to pay the cost of certain repairs done to his said. vessel, and other charges and expenses incurred by him at the said port of Hull, for and in respect of the said vessel, and also to enable him the said . . . to prosecute his said voyage (as he the said . . . doth hereby admit and acknowledge, testified by his executing these presents), and the said hath agreed to stand and bear the hazard and adventure thereof on the hull and body of the said ship, her tackles, furnitures, apparel, and also on the said cargo laden on board the said ship. and the freight thereof upon the said intended voyage, which the said . . . hath and by these presents doth respectively assign over and mortgage unto the said his heirs, executors, administrators, and assigns. And the said . . . doth declare that the said ship or vessel . . her tackle, furniture, and apparel, together with the said cargo and freight due and to become due in respect thereof, hath been and is thus assigned over and mortgaged unto the said . . . his executors, administrators, and assigns, for the security of the said . . . and shall be delivered to no other use or purpose whatsoever until payment and full satisfaction of this Bond, together with the premium hereinafter mentioned, shall be made and com-

Now the condition of the above-written obligation is such that if the said ship or vessel do and shall with all convenient speed proceed and sail from and out of the said port of Hull to the port of aforesaid, or so near thereto as she can safely get without deviation (damages and casualties of the seas excepted), and also if the above bounden . . . executors, or administrators, do and shall immediately after the said ship's arrival at . . . aforesaid, or so near thereto as she can safely get, well and truly pay or cause to be paid to the said his executors, administrators, or assigns, or his or their lawful attorney or attorneys, the sum of . . . of good and lawful money aforesaid, with . . . pounds and . . . shillings per cent. bottomry premium thereon, making together the sum of . . , or if in the said voyage and before the ship's arrival at . . . aforesaid, or so near thereto as she could otherwise have safely got, an utter loss of the said ship by fire, enemics, or any other casualty, shall unavoidably happen, to be sufficiently proved by the said . . . his heirs, executors, or administrators, then the above-written Bond or obligation to be void, otherwise to be and remain in full force and virtue.

(The Captain's signature)
L. S.

Sealed and delivered in the presence of N. N. (Notary)

N. N. (Witness)

54.—FORM OF FRENCH CONTRAT À LA GROSSE. Je soussigné (capitaine) . . . demeurant à . . . capitaine da . . (brig) . . . de la jange de . . . ayant . . . hommes d'équipage, tout compris, ayant relûché à . . . (Cherbourg) . . dans mon voyage de à . . . avcc un chargement de . . : (bois de construction) . . . pour ce dernier port, reconnais et confesse avoir reçu de Monsieur . . . négociant . . . demeurant à eu espèces et frais du présent acte la somme de . . . à la grosse aventure de mor, pour servir au palement de la réparation de mon dit uavire et frais à la cargaison, de laquelle somme ledit sieur court les risques de mer et autres quelconques (sauf toute contribution aux avaries simples, dont il est dispense) jusqu'à ce que je sois arrivé à . . . où étant rendu, je promets et m'oblige de payer à l'ordre do la somme de . . . (emprunt et prime) . . . y compris l'intérêt de grosse, à cause desdits risques, lui affectant et hypothéquant, à cot effet, les marchandises composant ma cargaison, les corns, quille agrès, apparaux, dépendances et le fret de mon dit navire de même que tous mes bions présents et à venir, et même ma persoune conformément aux lois et aux us et coutumes de la mer : en foi de quoi j'ai signé le présent double pour servir et ne valoir que d'un seul et même, à . . Cherbourg . . .

(Signature du Capitaine)
Capital (en chiffres)
Bénéfice (en id.)

55.— FORM OF GERMAN HONKRIM-BRIEF.

46. Garbeinnier, Schiefen der Greichen der Greichen der Greichen des Greichen des Greichen des Greichenster Gestlichen der Greichen der Gr

Unterfdrift bes Rapitains . . .

Unterfdrift ber Beugen.

ENGLISH LITERATURE.—XIV. [Continued from p. 71.]

THE CIVIL WAR AND THE COMMONWEALTH: PROSE (continued).

SIR THOMAS BROWNE was a physician of eminence who practised at Norwich; he lived throughout the whole of the civil contests, and survived the Restoration by many years. His works are many and various, but they are all characterised by the same qualities, great and abstruse learning, extraordinary freshness and originality of thought, richness and quaintness of illustration, and great eloquence of language. They breathe a spirit of the profoundest plety, combined with the largest charity and tolerance. The tone of Browne's writings in this respect, as well as his peculiar style, may be well illustrated by a single passage from his most popular work, the "Religio Medici," a physician's religion. Speaking of Christians who differ from him, and especially of Roman Catholics, he says :-

"I am not scrupulous to converse and live with them, to ' enter their churches in defect of ours, and pray either with them or for them.' I could never perceive any rational consequence from those many texts which prohibit the children of Ismel to pollute themselves with the temples of the heathens; we being all Christians, and not divided by such dotrated unpioties as might profano our prayers, or the pince wherein wemake them; or that a resolved conscience may not adore her Creator anywhere, especially in places devoted to his service; where, if their devotions offend him, nine, may please him; if theirs profano it, mine moy hollow it. Holy water and crucifix . -dangerous to the common peoplo-deceive not my judgmint. nor abuse my devotion at all. I am, I confess, naturally inclined to that which misguided zeal terms superstition; my nmon conversation I'do ocknowledge austere; my behoviour fall of rigour, sometimes not without moresity; yet, ot my dovotions, I love to use the civility of my knee, my lant, ond my hand, with all those consider motions which may express or promote my invisible devotion, I should visiote my own nest rather than a church; nor willingly deface the name of saint or martyr. At the sight of a oross or a crucifix I can dispense with my hat, but scarce with the thought or memory of my Baviour; I cannot lough ot, but rather pity, the fruitless journoys of pilgrims, or contemn the miserable condition of friare : for, though misploced in circumstances, there is something in lt of devotion. I could never hear the Ave-Mary bell without au elevation, or think it o sufficient warrant; because they erred in one encommutance, for me to errinall—that is, in allenge and dumb contempt. Whilst, therefore, they directed their devotions to her, I offered mine to God, and rectified the errors of their prayers by rightly ordering mine own. At a solenu procession I have wept abundantly, while my consorts, blind with opposition and prejudice, have fallen into an excess of scorn and laughter. There are, questionless, both in Greek, Romm, and African churches, rolemnities and ceremonicwhereof the wiger zeals do make a Christian use; oud which stand condemned by us, not as evil in themselves, but as allurements and baits of superstition to those vulgar heads which look asquist on the foce of truth, and those mistable . judgments that cannot consist in the narrow point and centre of virtue without a reel or stagesr to the circumference."

Next to "Religio Medici," the most popular of

Sir Thomas Browne's works are his "Pseudodoxia Epidemica," or Inquiries into Vulgar and Common Errors, and his "Hydriotaphia," or Treatise of Urn Burial.

Thomas Fuller was a clergyman, and followed the fortunes of the Royalist party and the Royalist party and the Royalist army during the civil war, in which he served as chaplain. It died intendicitely after the Restoration. Of his many works, the most generally known are his "Wortlies of Bogiand and Wales," his "Church History," and his "Liby War," as varied learning, and the most surking originality, lock of thought and expression, and sparkling with a quaint humour peculiar to the author.

Of all the great writers of the age of which we are now speaking, probably none produced so wide or so lasting an impression on the thoughts of men as Hobbes. Thomas Hobbes was born at Malmsbury, in Wiltshire, in 1588, being the son of a clergyman of that place. Having completed his university career at Magdalen Hall, Oxford, he became a tutor in the family of the Earl of Devonshire; and for many years he renwined, in various capacities, a member of that nobleman's household. He associated on terms of friendship with most of the leading men of the Royalist party, and was well known and esteemed by the most eminent philosophers and men of science on the Continent as well as in England. His works in Latin and in English are very numerous. They include treatises on various branches of natural philosophy, but they chiefly treat of metaphysical and ethical philosophy, and the application of those sciences to politics and government. In philosophy Hobbes was a strict materialist; in morals, a utilitarian in the narrowest sense of the term: in politics, a strong supporter of monarchical power, and an unqualified enemy of popular liberty. His first English work, a translation of the History of Thucydides, is said to have been published with a view to warn men by example of the dangers of civil disunion. His most famous work, the "Leviathan," is an elaborate argument for the necessity of a strong, monarchy to control men. whom, according to Hobbes's view, nothing but force can restrain. The last of his works, "Behemoth," which was not actually published till after his death, is a history of the Civil War, written in the kingly interest. Hobbes's style is a model of clearness and vigour. He died in 1679.

It must not be supposed that the very brief sketch which we have been able to give of the most eminent prose writers during the Civil Wax and the Commonwealth affords anything like a full view of the intellectual energy of the age. We have mentioned only those writers whose works are most important to the student of English literature generally, Many of the greatest men of that time, writing for the learned, wrote wholly in Latin, the language of the learned. Many, again, wrote upon subjects too special, too remote from ordinary interest, to fall within the scope of these lessons.

We have also passed by Milton, one of the greatest prose writers as well as the greatest poet of his age; his prose works we shall consider here-

POETRY. The period of the Civil War and the Common-

wealth produced many poets; but, excepting always Milton, whom we shall have to treat of separately, they were neither very great individually, nor did they, like the second-rate poets and dramatists of the preceding generation, belong to a great school, writing under the influence of its principles and following its traditions. The period at which we have now arrived produced a class of poet's distinguished rather by learning and subtlety than by truth or poetic feeling. To those poets Johnson gave the name of the metaphysical poets. The name is not very happily chosen, but it has been generally adopted by later writers; and Johnson's description of the characteristics of this class of writers, though a little exaggerated, is, if applied to the more extravagant examples of the class, in the main just :- "The metaphysical poets were men of learning, and to show their learning was their whole endeavour; but, unluckily resolving to show it in rhyme, instead of writing poetry, they only wrote verses, and very often such verses as stood the trial of the finger better than of the car; for the modulation was so imperfect that they were only to be found verses by counting the syllables. If the father of criticism has rightly denominated poetry τέχνη μιμητική, an imitative art, those writers will, without great wrong, lose the name of poets; for they cannot be said to have imitated anything. They neither copied nature nor life; neither painted the forms of matter, nor represented the operations of intellect. . . . Their thoughts are often new, but seldom natural; they are not obvious, but neither are they just; and the reader, far from wondering that he missed them, wonders more frequently by what perverseness of industry they were ever found. . . . The most heterogeneous ideas are yoked by violence together; nature and art are ransacked for illustrations, comparisons, and allusions: their learning instructs, and their subtlety surprises; but the reader commonly thinks his improvement dearly bought, and though he sometimes admires, is seldom pleased. . . . From this account of their compositions it will be readily inferred that they were not successful in representing or moving the affections. Nor was the sublime more willhin their reach than the mathetic. the reward of his devotion; and he died in retirement and disappointment in 1667. Of poets whose fame while living has been mything like a great as Cowley's there is urobably hardly any



Dian axes Capan

Those writers who lay on the wated for novely combil how little hope of greatters, for great things cannot have escaped fornorr observation. Their attompts were always analytic; they broke erecy image into fragments; and could no more represent, by their slender camerits and laboured particularities, the prospects of nature or the series of life, thus he with off-series a sambean with a prism can exhibit the with off-series of a nanora roun."

The origin of this school of poetry in England Is traced back by Johnson to Domm, whom we have already mentioned as a satirist among the poets of the Elizabethan age. The principal representative of the class in the following age was Cowley.

Abraham Cowley was born In Loudon In 1618, his practical belonging to the trade-sounce dees. He received his education at Westminster School and at Candendy. From a very early age he gave proof of extraordinary intellectual vigour and green literary solitie, and hist the formation of the high reputation which he equipped monap his contemporates. Throughout the civil controls and the Commonwhile, Cowley warmly exposered the side Proposed to the contemporary of the contemporary of the contemporary of the contemporary of the proposed proposed to prove a though and shown by the road family. After the Restoration he, like many other faltifulal addresses of neverthy, failed to obtain whose works posterity has so completely forgotten as his. He was the author of a great number of short poems mon the must various subjects, and of very various degrees of merit, but all tainted more or less by the vices pointed out by Johnson in the passage we have quoted. The works of Cowley post admired by his contemporaries were his "Pindarie Odes," of which some are free translations of the odes of Pindar, others original odes composed in a style which was once thought searcely inferior to Pindar. But to a modera reader it is very difficult to detect their merit. "The Davidels" is an opic poem, intended to have extended to twelve books, but of which only four were completed, upon the life of David. It is said to have been written by Cowley when a very young man. There are few poems in the language so wholly wenrisome, so destitute of life and interest, and so perpetually off-ading against every principle of good taste. As a prose writer, Cowley is far more pleasing than as a poet; his "Essays" upon various subjects of taste and criticism fully deserve the high regutation they have always enjoyed.

Among the minor poets of that age, there is probably more whose works have retained their popularity to the same degree as those of George Heibert. Where Cowley and oven Waller have one wader, Herbort has handrish, 'This hading properties with jo owns all saids as much to the party and marky to own and head as much to the party and the properties of the properties of the properties of the properties of public country, and was classical as in 1982; he was clustered in 1982; he was contrained and opposite. But it was an an occurry country and the properties of the p

la 1033.

Somewhat similar in obaracter to the poetry of Horbert is that of Richard Crashew, a peet born a few years later than Horbert. Crashaw was educated at Oxford, but he soon became a Roman Catholic, and died at un early age un ecclesiastic in the Roman Cotholic Church.

Francis Quartee is one of the writers most completely rained by site prevailing taste of his day; his writings are to modern readers almost unbomblo from their affectation and wast of sunlicity. A series of "Divino Embloms" is the best nown of his works.

A post of fir, apperier quality to Quarter was togged Willen. In the both seconds the doubte of the discovery Willen. In the both seconds the doubt of the fire Deltomine. In all the centeste of the two post of the discovery prot of a visible his let we use out the content of the two post of the discovery prot of a visible his let was out the discovery prot of a visible his let was out the discovery prot of a visible his let was out to the discovery with the discovery of the discovery with the discovery of the d

"gasil I, wasting in sterpair,
Die beessee is wessern fair?
Die beessee is wessern fair?
Die nog checke nache pals with ears,
Die she fairer than the day,
Or the flowery smoods in May—
If the les not see to see,
What can I have fair also be?
"Greek organd, or land or fair,
I will die ere den deall graver,
I will die ere den deall graver,
I will die ere den deall graver,
I dae dig little aus when I wo,

If the slight use when I wee, I can seem sed let her go; For if she be not for me, What case I for when she be?"

Bolore Herrick was been before the close of the sisteoath century, and lived till some years after the Residention. He was by profession a clergramen, and rector of a country parsh; but to teats used sympatiles to was a wit and man of the world. While showing strongly the fields of his spersensousness, subtlety, and want of simplicity—Herrick's peems also show in a poculiar degree the highest excellence of the period. For reference of the other contracts of the contract of

make possible bousine of the mines pentry of the profession of the mines switzing in control to the profession of the mines warring in control to the profession of the Wilson and Kerricks are fishing to be speech in Wilson and Kerricks are fishing to be present in the profession of
writers has over tasolod, and which is fronteilly writers have a contracted, and which is fronteilly classes are flooding and Carolinos.

Bit clobe flooding, who been early in the classes are flooding and contract the contract the classes are flooding and condition of the sort relega, we as consider, on whole condition of the sort relega, we as consider, on whole condition of the sort relegation of the condition of the conditio

"The maid, and hereby hangs a tale— For stell a unid no Whitam als Could ever yet produce: No grape that's hardly ripe could be So round, so plump, so soft as she, Nor half so full of pine,



EDMIND WALLER. (From a Portrait by Kneller.)

"Her finger was so small, the ring
Would not stay on which they did bring,
It was too wide a peek.
And, to say truth (for out it must),
It looked like the great collar (just)
About our wome cold's neck.

" Her feet, beneath her potticont, Like little mice stole in and out, As if they feared the light, But, oh I she dances such a way I No sun upon an Easter day Is half so fine a sight."

of all the song-writers of this period, perhaps the first place is due to loll Ribhard Lovelboe. He lived through the whole of the stormy period which included the Civil War and the Commonwealth. He can be also that the contract the civil War and the Commonwealth of the contract the civil was a contract to the war; and in propertion as the King's cause declined the fortunes of Lovelhoe suffered with it. He was reclued to poverty, was frequently imprisoned, and died at last in extreme distress, just too soon to see the tide of fortune turn, and the strainph of his party in the contract the contrac

Prison," is one of the most beautiful lyrics in our language:-

"When Love with unconfined wings Hovers within my gates, And my divine Aithen brings To whisper at the grates; When I lie tangled in her lair,

When I lie tangled in her hair, And fettered to her eye, The birds that wanton in the air Know no such liberty.

When flowing cups run swiftly round, With no allaying Thames, Our careless heads with roses crowned, Our hearts with loyal flames; When thirsty grief in wine we steep, When healthy and draughts go free—

When healths and draughts go free-Fishes that tipple in the deep Know no such liberty. "When, like committed linnels, I with shiller threat shall sing

With shiller throat shall sing
The sweetness, mercy, majesty,
And glories of my king;
When I shall voice aloud how good
He is, how great should be,
Ealarged winds, that out the flood,
Know no such liberty.

"Stone walls do not a prison make, Nor iroe bars a enge; Minds innocent and quiet take That for an herollage. If I have freedom in my löve, And in my houl am free, Angels alone, that soar above, Enjoy such liberty."

And not less perfect is his little poem, "To Lucasta on Going to the Wars":—

"Tell me not, sweet, I am unkind, That from the numbery Of thy chaste breast and quiet mind To war and arms I fly.

"True a new mistress new I chase, The first fee in the field; And with a firmer faith embrace A sword, a horse, a shield.

"Yet this inconstancy is such
As you too shall adors;
I could not love thee, dear, so much
"Loved I not honour more."

To the same class of caralier poets belongs of Cleveland, a poet who, in his own day, enjoyed a higher reputation than either Suckling or Lovelace, though postority has reversed this judgment. His chief powers were as a satirist.

Two poets in perticular, Waller und Denham, sietempied by Johnson from the catalogue of microphysical poets. They, he says, "sought another way to fame, by improving the harmony of our numbers"; and although, in the case of Waller, most modern 'etities might he state before acquitting him, absolutely of the churge intended to be conveyed by the entitle the metalysical, there can be no doubt.

that both the poets named contributed largely to the improvement of English versification.

Eliand Waller was born in 1603, and lived till 1687. During this period be filled a prominent simplest and least ambitious among Waller's poems are to a modern reader the most pleasing. The following very graceful song to a rese is a very favourable specimen of his manner:—



Briconstitus Cuppen (snowing Wallin's Monthers).
(From a Photograph by Taunt & Sons Oxford.)

place in public affairs. By hirth he was a country gentleman, and at an early age he inherited an ample fortune. He entered Parliament early, and his wit and elequence soon acquired for him a popularity which he never lost; though, by his selfish and unscrupalous conduct, he forfeited the respect of all parties. As a near relation of Hampden and Crouwell, his family connections were on the side of the Parliament: but his sympathles, so far as he had any, seem to have been rather with the opposite party. On one occasion he suffered banishment and a pecuniary fine for being a party to a foolish and comewhat discreditable plot in favour of the King, and might have incurred a heavier penalty had he not escaped by a cowardly betrayal of his friends. He was, in fact, an unprincipled and timeserving politician, a bad specimen of what in the next generation would have been called a trimmer; and be panegyrised with equal zeal Charles I., Cromwell, and Charles 11. As a poet, a wit, and a man of letters, he enjoyed on unrivalled fame in his own day; but his works are little read now, and deservedly so. His verses never jar upon the ear, and his ideas but rarely offend the taste; but he very roldom rises above the tamest mediocrity. The "Go, leachy rose t Tell her that wastes her time and me, That non she knows, When I resemble her to three How sweet and fair she seems to be, "Tell her that's 3 ouns And shines to have her graces spied, That hadet then sprung In deserts where no men abide, Then must have uncommended died "Small is the worth Of beauty from the light refired : Bid her come forth, Suffer herself to be desired. And not blush so to be admired "Then die I that she. The common fate of all things rare. May read in thee:

May read in thee: How small a space of time they share, That are so would out a weet and fair "

Sir John Denham, whom Johnson, as we have seen, coupled with Waller as an unprotor of our numbers, was not a very voluminous writer. His best as well as most celclurated poem is "Coopera Hill." It is the earliest of a class of poems which have since become extremely common—poems in honour of particular localities. The subject, "Copper's Hill," is a spot of that name close to the rhame. Deham, is a mainer varied, but always hearing, describes the beauties of the place, and expresses the throughts and recollections which it suggests. His style and verification are always medicions, and be sometimes rise to a high degree of elevation and dignity. One of the finest passages in the power is that in which, after an eloquent dear and its character as a stream, he closes with the lines which larte or as a tream, he closes with the lines which larte when for the model from the days of Dyrdon downwards:—

"Oh, could I flow like thee, and make thy stream

My great example, as it is my theme! Though deep, yet clear; though gentle, yet not dull; Strong without rage, without o'erflowing full."

Two other posts, from among a large number of obscurer natures, demand mention, though we can oily unention them. William Browne was the author of a series of pastoral poses of much unerit, published under the name of "Britannia's Pastornia." Size William Davennat serjoyad great frame as a fix William Davennat serjoyad great frame as a manufact poem of heavier absorbered in the series of the post of

HEAT .-- II. [Continued from p. 84.]

PRACTICAL APPLICATIONS.

ADVANTAGE is frequently taken of the property which the metals possess of expanding with heat and contracting with cold. Some years ago the walls of a large building in Paris had bulged outwards considerably, so as to endanger the structure. A number of iron rods were accordingly taken and passed through the building from side to side. the ends passing outside through large face-plates, and being secured by nuts screwed on to them. When these were screwed up as far as possible. the alternate rods were expanded by being heated. and then the nuts could be screwed up further on them. As they cooled the walls were drawn together to a slight extent, and the same process was then repeated with the other rods; and in this way the walls were gradually brought to the perpendicular.

For a similar reason the tire is always made hot before being put on a wheel, and then as it cools it forces the different pieces more closely togetheir, and renders the wheel much stronger. So, too, in the manufacture of Armstrong gans, the different cells are strunk on; and in making beliers, the plates are riveted together with hot rivets. The contraction of the metal while cooling renders the joint in each case much more close and tight than it would otherwise be.

In large iron bridges, like that over the Menai Straits, or some of those across the Thames, the heat of the sun's rays is sufficient to curve and raise

the bridge in the middle, producing often a greater deflection than the heaviest load does.

By reference to the table of expansions on page 84, it will be seen that some metals expand more than others for a similar increase of temperature. Hence, if thin bars of two different metals—as, for example, copper and iron-bo taken, and rivoted firmly together, and then exposed to an elevated temperature. the copper will expand more than the iron, and the bar will become curved, the iron being on the inner side. If, on the other hand, it he exposed to a lower temperature, the copper bar will become the shorter, and thus that will be the inner one in the curve. This fact is sometimes turned into account in the manufacture of compensating pendulums. As has been explained, any increase in the length of a pendulum makes it vibrate more slowly; hence, in hot weather, a chronometer would lose a little. To guard against this, different forms of comnensating pendulum have been tried. One of these forms is represented in Fig. 10, a, b, c, A compound bar of copper and iron, with halls at each end, is fixed to the pendulum rod, the copper side of the bar being underneath, as that metal is more expansible. When the temperature falls, the pendulum rod contracts and raises the bob; the strip, however, curves downwards, as shown in the middle figure b. and thus the centre of gravity remains stationary. If the temperature rises, the strip curves upwards asHEAT. 139

at σ , and thus the balls at the end of it rise and compensate for the increase in the length of the rod. A similar plan is adopted in the balance-wheels of the best watches.

Another application of the same principle is made



in Dreguet's metallic thermometer (Fig. 11). A compound ribbon is here twisted into a spiral, which is fixed to the stand at its upper end, and carries a needle below. This spiral coils or uncolls as the temperature changes, and the needle shows the readings on the graduated disc.

HEAT CONVERTED INTO AUDIBLE MOTION.

There is one more experiment which must be described here, as it is a good illustration of expandon, and at the same time illustrates the conversion of heat into motion. The apparatus employed is known as the "rocker," or Trevelynn instrument, from the name of the gentleman who first constructed it. He ind one day hid a hot offered grid one a blook of ladd to cool, and was surfaced in the cool of the cool of the second of the cool of



taken. about five inches long and an inch and a half wide. Its section is almost trinagular, but a small groove is made along the apex, c, and a piece of wire terminating in a knob, a, is fixed in one end. Let the rocker now be raised to a high temperature, and then placed so that the knob, a, may rest upon, a table, while the grooved edge of brass lies upon a table, while the grooved edge of brass lies upon a block of lend. A succession of quick taps will be heard, and the rocker will be found to be in rapid-vibration. By increasing the width of the groove,

the vibrations may be rendered more and more rapid until a distinct musical note is obtained.

The explanation of this is easily given. When the rocker is laid on the block in portion of one object is comes in natual contact with the lend. This metal, being very expansible inmediately little metal, being very expansible inmediately little which therefore sets upon a freely pation. This immediately expands in like manner, and in the content of the content which there is no many which is heard. The heart which though content is beautiful to be and an in imparting motion the brans, and this motion becomes in turn communicated to the air, manifesting itself in the form of sound.

EXPANSION OF LIQUIDS.

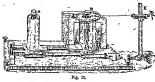
Thus far we have been concerned with the expansion of solids We have now to see how liquids expand under the influence of heat, and in their case it is evidently the cubical and not the linear expansion with which we have to deal. As, howover, the liquid must be contained in some vessel, and that vessel expands as well as the liquid, wo must distinguish between the apparent and the real expansion of the liquid, the latter being the larger of the two by just the amount that the vessel is increased in capacity. Thus, let the liquid in the flask (Fig. 7,p. 83) stand at the level A, and when it is immersed in a jar of hot water let it rise to the level B; the apparent expansion is the quantity contained in the tube between A and B. If, however, the flask had retained exactly its original capacity, the liquid would have risen higher in the stem, showing that the real expansion is greater.

Liquids generally do not expand uniformly; the amount of expansion between 60° and 60° F, for example, would not be the same as that between 100° and 200° F. Mercury; however, is an exception to this rule, as between 50° and 212° F. It expands uniformly, and hence it is specially litted for use in table shows the apparent expansion in glass of table shows the apparent expansion in glass of several liquids when rates of from 32° to 212° F. :—

The way in which the real expansion of mercury is ascertiance is by filling two vertical tubes A and n with it, and making them communicate by a small but opening into their lower ends (Fig. 13). One tabe is now surrounded by a fincket containing boiling water, while the other is surrounded by melting ice. The mercury in the hot one will stand at a higher level than tabe in the other. This difference is measured by a telescope K properly adjusted, and shows the real expansion.

ANOMALOUS BEHAVIOUR OF WATER

There is an interesting experiment in connection with the expansion of water which shows a departure from the general rule. Let a tall glass vessel be filled with water, with a small thermometer at the



bottom of it, and a second near the top. Now put the whole in a place where the temperature is below the freeding-point; both thermometers will fail, the lower one, however, more rapidly than the other till it reaches about 10° F, whom it will become stationary. The upper one will continue to full down to 38° F, and then the water will begin to freeze, and the vessel will probably be cracked.

The explanation of this is found in the fact that at first the cooler water from the top and sides, being more dense, sinks to the bottom. When, however, water attains the temperature of 39 4°F., it has attained its maximum density, and then, instead of continuing to contract, it expands slightly till it reaches the freezing-point, when it suddenly expands still further. Thus, in the above experiment, the water at 39.4° was at its greatest density, and hence remained at the bottom. This provision is of great. importance to us, as, were it not for it, the coldest water would sink to the bottoins of our seas and rivers till all attained a temperature of 32° F., and they would then be slowly converted into masses of solid ice, whereas now the colder water and ice on the top protects that below.

There are other bodies which behave in this anomalous manner, a notable example being that of iodide of silver.

The great expansion of water on becoming converted into ice is often a opinfully manifested in the bursting of our waterpipes and plugs during a frost that it need not be fillustrated farther. It is well, however, to guard against the common error of supposing that it is the thraw which barsts them. The real fact is that the ice has done it, but it remains as a soll plug till the thraw comes; it then becomes melted, and the water at once flows out of the crack.

THE EXPANSION OF GASES.

The expansion of gases is much greater than that of either solids or liquids; being usually taken at $\tau_0^1 \tau_0^2$ of the volume at 32° F. for each degree Fahrenheit they are mised above that point (or $\tau_0^1 \tau_0$ of the

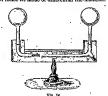
volume for each degree Centigrade).
This rate is very nearly the same for all gases, and is uniform for all temperatures, except the gas be near its

perntures, except the gas be near its point of condensation.

Advantage is taken of the great expansibility of air in the construc-

expansibility of air in the construction of the differential thermometer, which is used to measure very small autonates of heat. It consists of two large bulbs (Fig. 14) containing air, and connected by a tube, in which is placed a drop of coloured liquid to serve as an index. If now one of the

bulbs be mised to a higher temperature than the other, the aft in it will expand and drive the liquid nearer the other, the distance it moves being shown by means of a graduated scale. When both bulbs are exposed to the same temperature no effect is produced; it is only the difference that is shown, and hence its name of differential thermometer.



CHANGE OF STATE PRODUCED BY HEAT.

The next effect of heir we have to notice is that namificated in proboting a change of rate in different bodies. The three states of water—jee, water, atom—femiliar to all, arise nearly from alterations in the heat. Some substances do not face at all, but at high temperatures become decomposed; most organic substances belong to this class. Many bodies, however, then at, moderate degrees of temperature, and we find the following laws respecting the point of ruison—The temperature at which I asion commences is constant for any substance so long as the pressure remotas constant;

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and, from the time that faston commences, the temperature rounds rationary until the whele of the sab-tance is melted. Some anb-tances, as iron and wax, soften gradually before they actually fase, while others, as lead and copper, melt without this softening. In the case of iron, great advantage is derived from this property, as by measus of it the indepentition world different places together, or though the control of the control of the control of done with those metals which do not soften in this way.

LATENT HEAT OF WATER AND STEAM,
that has to be communicated to a body to change
it from one state to another, and during this conversion the body suffers no alteration of temperature.
The quantity of heat required to change ice to hquid
water is termed the latout heat of water, and the

water is termed the latent heat of water, and the quantity of heat required to change liquid water to steam or guscons water its spoken of as the latent heat of steam. We may therefore define latent heat as the quantity of heat required to risange a body from agiven state to another state without changing

its temperature.

These facts are experimentally ascertained some wint as follows:—A pound of water at 80°C, is mixed with a pound of liquid water at 0°C, it is temperature of the mixture is found to be 10°C, the mean of the two. I/e, the but water has had to inpact, and the cold water to recycle, equal quantities of level to hing them to a given temperature, of level to hing them to a given temperature of pound of water at 80°C, the temperature remains at 0° and all the fee is metiod. Therefore 80 units to least contained in this hot water inver been rendered latent in converting the solld to liquid water, and this is the latent lend of water.

Let us next take the case of steam. Water in the flask (Fig. 15) is boiled, and when steam is issuing from the delivery tube, it is dipped into the jar of water at A. The steam condenses to the liquid state; the temperature of the water is raised, and its weight is increased by the amount of steam condensed. These are the data:-Temperature of water in the jar before the experiment 20° C.; after the experiment 40°C. Therefore the increase is 20°C. Weight of water in the flask at the commencement, 3.6 pounds; after the experiment, 3.72 pounds. Therefore, the weight of steam condensed is 0.12 of a pound. The issning steam at 100°C, has been condensed and further lowered to 40°C, in mising the original weight of water to 40° C., i.e. in imparting-

3.6 × 20 = 72 units of heat.

Now, if we deduct from this the quantity of heat imparted by the 0·12 of a pound of newly liquefied water in changing from 100°C, to 40°C., the difference will be the quantity of heat impurted by the same weight of steam at 100°C, in condensing to water at 100°C,—

72 - (0 12 > 60) = 61 8 units of heat,

Consequently, 61.8 units of heat have been imparted to the water in the jar, a, by the condensation of 0.12 of a pound of stemu; therefore one pound of stem would yield 510 units of heat, since —

032 . 1 . . 64 8 549.

And, conversely, it would take 510 units of heat to convert one pound of water at 100°C, into steam at the same temperature; 510 is therefore the latent heat of steam.

It is this large amount of latent heat in steam that renders it so useful as a beating agent, for it



Pag. 15.

must be remembered that heat cannot be destroyed or aunihilated, but is rendered sensible again when the steam becomes condensed.

The great degree of heat to which the human body may be exposed without danser has often excited much attention. Ment and early have been cooked by being placed in a leated room in which men favor remained all the time, and suffered ment have remained all the time, and suffered ment have been at all increased by the high temperature around them. The reason of this is now, however, clear: the heat, instead of the dispension of the composition of the supering the perspuritor and convertigation of the composition of the supering the perspuritor and convertigation of the supering that outpour, and in this way the whole of an animal safety-where to regardant the temperature.

VARIATION OF PREEZING-POINT RAOULT'S LAW.

If all the sit be driven out of water by boiling, and it is then allowed to each without being disturbed, and is exposed to a low temperature, it will not freeze till sevenal degrees below 0°C; but as lower of the sevenal degrees below 0°C; but as once rive to that point, clearly showing that the untertal heat of water is given on an in freeze. This fact clearly explains why n cent of ice forms so slowly. Were it not for this provision, as soon as.

any mass of water had sunk to the temperature of 0° C., it would become a mass of ice; but now, every particle as it freezes gives out its intent heat,

and thus raises the temperature of the rest.

It has recently been shown that the freezing-point



of a solution bears a relation to the molecular weight of the dissalved substance (For the meaning of "molecular weight," see lessons on Chemistry) The law, which is generally known as Rasult's law, any be thus expressed,lf the molecular weight in grammes of any substance be dissolved in 100 time the molecular weight in grammes of any liquid, the freezing-point of this liquid will be lowered by contra c I BEERING MIXTURES.

Devolving any substance in a Hanid always lowers the temperature. This may easily be seen by throw-ing some salt into water, and carefully observing the effect produced on a thermometer placed in it. This uncorpilon of heat during hypefaction is turned to account in the preparation of freezing mixtures for the moduction of artificial cold. In these, two or more substance- which have a chemical affinity for each other, and of which one at least is a solid, are mixed together, and during the solution a considerable amount of heat is rendered latent

Many different mixtures have been used, one or two of which we give here.

A mixture of about two parts of snow or pounded a minute of about we parts of show or pointed inc to one of sait will reduce the temperature to V on the Fuhrenheit scale. This point, in fact, was chosen by Fahrenheit as the zero of bils scale, as he believed it was the Jowest temperature attainable.

The mixture rapidly liquefies, and if a small vessel of water he placed in it, the water will speedily he frozen. A mixture of 6 parts of substate of sodo. 5 of ultrate of numouls, and 1 of dilute nitric acid. will cause a still greater reduction of temperature.

VARIATION OF BOHANG-POINT WITH PROPERTY. Water on attaining the temperature of 212' P. enters lute a state of challition; a large number of middles of steam are produced at the part of the wesel which is exposed to the source of heat; these rise through the liquid, violently agitating it as they turst. The point at which this abullition commences is that at which the tension of the steam becomes sufficient to overcome the pre-sure of the almo-sphere; and hence, if this pre-sure be increased, the boiling-point will be raised.

Thus, though the bulling-point of water is said to be 212' F., this is only true when the barometer staml- at 30 lacke-; when it is lover than this, water bolls at a lower temperature. In an open vessel the temperature of a liquid can never be raised above its builing-point, as all the surplas heat received is camployed in evaporating the water. If, however, a closed vessel be candoved, the water. If, however, a closed vessel be completed, the presence may be increased, and a much higher temperature attained. The apparatus usually rea-ploted for this purpose is known as Papiars Digester, and is represented in Fig. 16. It consists of a strong tran vessel, a, the lit of which is freed on tightly by means of a seriew, B. A safety-calve, s, is also provided, so as to allow of the escape of the vapour

when its clastic furce becomes too great. In this way a temperature greatly exceeding 212° F, may

Fig. 17.

be attained, and many substances are thus dissolved which are otherwise insoluble.

The fact that water boils at a lower temperature If the pressure on it be diminished may easily be proved experimentally. Pour some water into n ARCHITECTURE.

fixic, and place it over a spirit lemp till it bells; where the stoam is issuing freely; remove the lamps and cost: the finak tightly. After a few misutes pour a stroug of cold water on the cotsule or immerse it in the cold water, and abolition will immediately commence. The steam has explaid misumediately commence, the steam has explaid misumediately commence, the steam has been a support of the control of the pressure is disinistized, in consequence of which the wrate beginn again to boil (Fig. 17).

of the nobility who settical down in the neighborishood of the French Coort. The style is the work of ourside whose in the relation of parties who still restain the traditional sprit of Gobbie design, has introduce ornaments and monitings which partake of classic origio. The work is strictly confined to manifolant, wholes, there and there observed more than the confidence of the string of the confidence with debased forms of classic octars and comments employed for the details. In second,



Pontan' Lynn.

ARCHITECTURE-XII.

THE ITALIAN, OR REASHBANCE STILE (seriesce). WE must now, however, turn to France, where the remembles provide a known as the style of Francis I. Formstein provide a known as the style of Francis I. France took place which the latest phase of Francis Gallich, the Gallich of Francis Gallich, and the state of the Gallich of Gallich or The Francis Gallich of Johns or robot consenses, or, of choloristials. Its cought in gradually at the loginating of the alternals of Johns or robot consenses, or, of choloristials. Its cought in gradually at the loginating of the alternals of Johns or the Gallich of Johnson, which was the Gallich of Johnson, and Canada, the Canada Canada Gallich of Johnson, and the consenses mustakens which was a state of the Johnson of Joh

work the form examples are from in the ab obligation. The commentary made of chamberle Bloths. Chromosomer, made of chamberle Bloths and the town-hall off Basequery and Orientary and Control of the proposition of the orient, the shape production of the principation of the orient country and the proposition of the principation or the control important productions of the principation or motive patients or apart. The square to the principation orient production or motive patients of the principation or which the Database patients of the principation or which the Database patients of the principation or the principation or the principation or which the Database patients of the principation of the production of the principation of the princi

is not visible except at a great distance. In the picturesque grouping of these roofs with the features resulting from them, the French architects evolved a style of extreme beauty, which now in England

architects, in the general principles of design they retained their own freedom. Whilst the . Louvie was being built, Catharine de Medicis selected a spot some 400 to 500 feet to the west



Por de -Tue Ordenes de Bron deponden Latine Brase de Parcer Gorine)

influences the new revival. In France, however, as in Italy, this transitional phase was destined to come to an end so soon as the laws and principles of the pure Italian orders were introduced into the country, and the first building in which their entry is seen as in the Louvre—in the first portice of the court of the old Louvre—built from the design of Pierre Lescot in 1540-48. It would seem that an Italian architect, Serlio, had been consulted; and it may possibly be to his influence that the classical purity of the superimposed orders with areades be-tween is to be ascribed. Lescot was assisted in his sculpture by Jean Goujon, who in the Fountain of the Innocents, and in other works in France, shows considerable delicacy and beauty in his sculpture. The introduction of Italian artists is also seen in the Palace of Fontainebleau, but chiefly in the interior in the sculpture of Primatichi. There is so much original French design in all these early works, that although Francis I. is said to have frequently called in the assistance of Italian to creek her palaee of the Tallories, part of which was designed by Philliert-do-D'rane. a distinct was designed by Philliert-do-D'rane. a distinct the two were united by blocks, built is successive periods; and the ones, north, and south parts of the periods; and the ones, north, and south parts of the from the design of Perranit. The cent part censists of a great periodity of Coorinthon columns outpied of a great periodity of Coorinthon columns outpied a factorist-flow of the control of the con

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but Mansard conceived the idea of making them all look like one palace, and set an example which, in this country, in Regent Street and in many of our squares, has been followed by the architects of the eighteenth century. The later phases of style are known by the names of the various monarchs who succeeded to the throne; and although in many cases there is a tendency to employ externally that rococo ornament which helongs to internal plasterwork, in the churches of the Invalides and St. Sulpice, in many of the public buildings in the Place de la Concorde, and in the St. Germain quarter, there are many fine palatial works. We no longer find, however, that picturesque design and that freedom from the conventional rules of Italian architecture which characterised the earlier examples. Many of these, now destroyed, have been illustrated in a well known work by Du Cerceau, an architect of the sixteenth century, to which we must refer our readers.

Almost with the single exception of the Castle of Heidelberg (Fig. 47), there is no transition work in Germany which is to be compared either in its design or in the excellence of its ornament and sculpture with French or Italian work. This palace, however, both in its commanding position and in the design and execution of its principal parts, is one of the richest and most effective compositions of the style, and is more or less entirely uninfluenced by the rules and principles of the Italian masters. Here again we find the lofty roofs, dormer windows, and gables which characterise French work. The church of St. Michael at Munich, based on the church of St. Andrea at Mantua, is almost the only ecclesiastical building which is worthy of note; and there are no seventeenth or eighteenth century palaces in which anything is found beyond a feeble imitation of Italian design.

The commercial prosperity of the Netherlands, to which we have already drawn attention in the lesson on Gothic architecture, had there called for the production of magnificent town-halls, guildhalls, and other structures of a palatial character, in the various towns. The transitional period in Belgium and Holland, therefore, produced much of the same spirit as that which we find in France. The general design is Gothic; the details are borrowed from classic sources, but chiefly for their ornamental features. and without the strict rules of application of the orders as laid down by the Italian masters; consequently, we find throughout the sixteenth, seventeenth, and eighteenth centuries buildings erected of picturesque outline, admirably snited to their requirements, and owing to the admixture of brick as an essential building material, varieties of design, which may be said almost to constitute a style of its own.

Spiin follors, on very much the same lines as that of France, a transition which is known as its that of France, a transition which is known as its Platersque, or silversmiths, atyle, in which Gothic design and Rendsausee ornament are found, the best examples of which are lound in the Aynanmients or town-shill of Servili, the university of Schimanson, and the hospital of Leon; in Rulium palance of Madrid (1737-47) are the Seist known examples; and with a decadent or Roccoo period of the very worst possible kind.

POLITICAL ECONOMY. VIII.

EXCHANGE (continued), . .

EXCHANGE EXCOURS—TAITEM AGAIN.— As the result of all these substitutes, the curious respil follows that when a good monetary system is established in a country the use of coin soon begins to decline. The better the system, the greater (cober things being equal) the findilities of commerce. But as commerce increases will can all handy small times are required for coin. Evaluation to wree particularly and the statement of the contraction of the con

The banks of Enrope have originated in various ways. The earliest banks-e.g., those of Genon in the sixteenth century-were what we should call finance companies. They assisted the Government. to borrow money by finding private people who would lend it through their agency. This also was the chief business at first of the Bank of England, The Bank of Amsterdam, as we have already said, was founded to save merchants the trouble of working out the exact value of the miscellaneous lots of foreign coin they received in payment. The bank counted it for them and credited it to them reduced to a standard "bank money"-which did not in fact exist as coin. They often made payments by orders on the bank for so much ! bank money "-like modern cheques. Some of the English private banking firms were at first goldsmiths. In Charles II.'s time, Professor Jevons tells us, the goldsmiths of London often kept armed men, and took special precautions to protect their stock of plate. A custom arose of depositing sums of money with them, and paying them for keeping it safe. Eventually, of course, it was found that the money could be invested at interest, and so the custom of making a charge for keeping it was abolished and bankers allowed their customers part of the interest carned so as to attract moremoney.

Primarily, then, the English bonks arose as places of safe keeping for money; while some of the foreign banks from their origin were to a great extent providers of substitutes for coin. And in most countries this provision by the I-sue of bank-notes have been, or still is, the most important part of the banking function; but it has generally become necessary for Government to regulatory become necessary for Government to regulatory into it own hands, or by licensing certain, banks of the own hands, or by licensing certain, banks or it is severally accurate the contribution of the own hands, or by licensing certain the section reserves.

Bank-note issue is in fact a lucrative privilege,

and has often only been granted to banks by the .Government in return for services rendered, In 1891 the Bank of Spain was permitted to increase its note issue on condition of lending the Government a very large sum without interest. The Bank of England received some of its privileges during the eighteenth century in return for similar services. In some of the United States note issue · was at one time permitted to any banks which could show a certain reserve of specie; but the so-called "wild car bankers" of the Western States, who issued notes and then suddenly closed their doors and disappeared with their specie reserve, brought bank-notes generally into discredit, and at the time of the War of Secession (in 1863) the Federal Government limited the privilege, and instituted the so-called "National Banks," which were obliged to invest a large part of their capital in United States bonds, and received certain privileges of note issue in return. It is evident that this was a method of extracting loans from the banks; because the success of the Federal Government being uncertain, they found a difficulty in inducing the public to lend them all the money they required for the war. But the reasons usually givon for regulating note issue are to protect the public against fraud-for most people, especially among the working classes, cannot tell which banks are unlikely to meet their engagements-and to prevent an over-issue of notes, leading to speculative purchases and a commercial crisis. -Should a bank have large powers of note issue with few or no restrictions as to reserve, the temptation would be very great to lend large sums (represented by notes) to speculative traders on very casy terms. These traders would thus be tempted into hazardous speculation, the competition between them would cut down their profits, and the notes, if in excess of the amount required by the trade of the country, would constantly be returning to the bank to be exchanged for gold, which it would be very difficult to provide fast enough. Hence, the notes would depreciate in value, the .

....

banks and many traders would fail, and there would be widespread loss. The deposit function, therefore, is coming to be the most important part of the work of most banks, and, as wealth increases, it is likely to be more important still.

Now, having this money deposited with it, the bank proceeds to lend it to traders, and, to some extent, to invest it in Government bonds, or other securities. Some banks, especially Colonial banks," lend money largely on mortgage; and sometimes'a. bank invests in productive enterprises, manufacture for instance; but it is generally held that this is undesirable, because it is of the first necessity to a bank to be able to convert its investments into coin, or the equivalent of coin, at once if more of its depositors than usual should want to withdraw their deposits in a hurry ; and manufacturing enterprises cannot usually be disposed of rapidly, and should trade be had their value greatly declines for the time. Most of the loans of a bank, therefore, are for short periods, and they are generally made to traders rather than to support productive labour in the strict sense of the term. They, in fact, facilitate transport and distribution rather than production, and stimulate the latter mainly by enabling merchants to get the product to market-lending them money, in short, that they may buy in order to resell. This was originally done by issuing bank. notes: now it is sometimes done by opening "credits," i.e., allowing a trader to draw obeques up to a certain sum, on which he pays interest ont of the gain he makes in the trade; or else by discounting either "accommodation bills" or regular bills of exchange.

The holder of a bill of exchange may, if he pleases, keep it till it reaches maturity; when he will be entitled to receive parment of the sum mentioned in it; or if he does not live in the place . where it is payable, he may sell it to someone who wishes to pay a debt there, and does not want the risk and expense of sending coin (as we shall see in connection with foreign trade); or if he wants coin for it, he can have it discounted at once. As we have explained before, a bank or a "bill discounter," or "discount broker" will do, this, deducting from the sum on the face of the bill a certain amount for trouble and risk, and something also representing the interest that the sum he advances may be supposed to produce in the time during which the bill has to run. Thus, if the interest was 4 per cent, per annum, and the bill for £100 were due on March 31st and were discounted on the previous December 31st, this part of the sum deducted would-be £1.

But now, how is this sum determined? As a matter of fact, it is not by looking at the current

rate of interest on safe investments, but by the relation between the supply of wealth ready to be lent for short periods, and the demand for it. Sometimes trade is brisk, traders are anxious to borrow, and the demand for loans is considerable. Sometimes again, trade is dull, either breause the political condition of Europe is uncertain, or because too much wealth is locked up in unremunerative enterprises, or from a variety of other reasons, so there is but little demand for loans, Clearly, in the first of these cases, the demand will tend to exceed the supply, and the holders of loanable wealth (i.e., the banks) will be able to exact high rates of interest, and so cut off a portion of the demand. In the second case, the banks will have a large amount of wealth which they will prefer to lend at low rates rather than to have it lie idle. That is, the rate of discount will be rogulated by the relation between the supply of loans for short periods and the demand for them.

Now it so happens that from the institution of the Clearing House (which will be explained presently), the largest amount of that part of the wealth of the country which is ready to be lont for short periods is under the control of the Bank of England. Now when most of the supply of a commodity is in the hands of one holder, he can pretty well regulate its market value. There is little reason for the holders of smaller amounts to sell at loss than the rate at which he solls: while, if they try to sell for more, they will certainly have to wait to dispose of their property tall his is all gone. The Bank of England, then, periodically "fixes the rate" by announcing on what terms it will lend woulth expressed in money on the security of bills of exchange, and other holders of wealth to be lent in the same way follow those terms-though since of late years discount houses have multiplied, the Bank of England does not control so large a part of this capital as formerly, and the "Bank rate" is not followed so closely as it was. Nobody is compelled to follow it, but it is usually the interest of most people concerned to do so.

Generally speaking, the fixing of the Bank rate precedes rather than follows the increase of demand for loamable wealth, or the increased supply of it. Long experience indicates to the directors what demand there will be, and (what is more inportant) what amount of gold is likely to be sent abroad within a short period. A certain reserve must be kept by the Bank to mose concerned the legal by the Bank to mose concerned the sent of the large of the large of the Act. Foreign countries frequently require gold either to pay for goods they send us, or as a reserve against fresh note issues, or for other purposes; this latter gold is often borrowed, and

it is the expectation that this most convenient form of wealth will be demanded abroad that induces the Bank of England to check the demand for these forms of loan, which may possibly increase the demand for gold in other ways. The mi-take of the Mercantile System, repeated by some of the advocates of Protection, has been to exaggerate the importance of the presence of plenty of gold in the country; it is seen that the supply may be inadequate for a short time to the demand, and that so a want of confidence may arise. It is not seen that directly gold gets senuty it rises in purchasing power; and so traders will, unless artificially restricted, send gold to purchase goods where it is searcest, and so the supply will be readjusted to the demand.

Let us here summarise the characteristics of the English banking system.

An ordinary English bank has a capital, owned by the partners in the firm, or by the shareholders; and from the large scale on which English banks usually do business, privato bankers are more and more giving way to large joint-stock companies. This capital is part of the security to the depositors that their deposits shall be repaid. Generally besides the actual paid-up capital, the shareholders are liable to be called upon to pay a good deal more. should the depositors' property be lost. Sometimes they are liable to make the whole of it good if necessary (as in private banks); but such liability may be a very serious matter for a shareholder, who can seldom know much about the management of a banking business. For instance, when the City of Glasgow Bank failed in 1878, the shareholders, from whom the state of its business had been concealed, not only had to lose their capital, but were called upon to pay twenty-seven times the amount besides. Generally, therefore, it is arranged that the shareholders' liability shall be limited. Often the amount is equal to the actual paid-up capital. On the faith of this liability and the paid-up capital, depositors lend their money, the deposits usually amounting at least to six or seven times as much as the paid-up capital. These sums are invested in various ways, usually such that they could be easily realised when more depositors than usual wish to withdraw their deposits.

Now it night be supposed that as every manager knows by experience about how much coin will be paid oil by his bank in a given time, a sufficient reserve of coin would be kept in the bank vanits to more, the daity payments. Dat in England at any rate this is not so—owing to the existence of the Clearing House. The object of this is as follows. Suppose that of two banks, A and B, the elegens A, holds on B on a given day amount to £10,009, while

those that E holds on A amount to £15,000. Clearly it would be waste of time and trouble for B to pay A £10,000 and receive back the same money and £5,000 more. The business could be settled more simply by A paying B £5.000. Now the Clearing House is an elaborate device for simplifying these payments and counter-payments by striking balances between the banks concerned, and only those balances are paid. But they are not paid in coin. Each bank which is a member of the Clearing House keeps an account at the Bank of England, and in the case supposed the £5,000 would simply be debited to A's account, and credited to B's on that Bank's books. Every bank not a member of the Clearing House keeps an account with some bank that is so. and gets its debts and demands on other banks settled up indirectly through the Clearing House. Thus the banks do not care to keep much coin on their own premises; they deposit it in the Bank of England, knowing they can get it when they wish. Except, for the restrictions imposed by the Bank Charter Act, and provided the Bank undertakes to furnish this coin on demand, it is free to dispose of this money as it pleases, and "it depends on the wisdom of its Directors whether the country shall be solvent or insolvent." In most countries, however, the specie reserve of the country is more or less under the control of the Government. In France, for instance, the Governor of the Bank of France is a State official; in the United States where financial affairs have of late years been the cause of considerable anxiety, the National Banking system puts the gold reserve of the country under the control of the Secretary of the Treasury. In England, though there is no such Government control, there is no practical danger, because the Directors of the Bank of England are leading business men, conscious of their responsibilities, very sensitive to public opinion, and likely to feel any shock to business, such as the mismanagement of the Bank would cause, as severely as anyone in the country in their own private affairs. There is, therefore, the best possible security for wise and cautious management.

We may note, to conclude this ambject, thint an outery is often mixed as to the contrast between the enormous dividends paid by English banks to their shareholders and the small sums allowed to their depositors. A bank paying 15 or 20 per cent. dividend annually, will give 15 or 2 per cent. dividend annually, will give 15 or 2 per cent. thereset on deposits for fixed periods, and nothing at all on "current accounts," ke, for game, which the depositor can draw out in small amounts by cheque. But nothing are not more about the sums of the contrast of the

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fails. On this security people deposit money with it, to the extent, let us say, of £20,000,000. Suppose it gets on the average four per cent. on the £21.000.000; the expenses of management are very heavy, especially those connected with the keeping of current accounts; something must be put by for reserve, and after allowing for these and say 2 per cent, interest on deposits, or £400,000, there may not be enough left of the £840,000, which represents four per cent, on the capital and deposits, to give more than a fraction more interest to each depositor. though there may be enough to pay a handsome return on a capital the amount of which is only one-twentieth of that of the deposits. Every additional £10,000 of profit means 1 per cent. dividend, but only ale per cent. interest on deposits.

An institution called "The Co-operative Credit Rank" was based on the misundestanding that underlies this outcry, some years ago. The projector announced that he would "allow depositors to participate in the profits" and pay them 15 per onen, per annum. Now no hank could do this continuously except by a series of minutes. The result stopped, the balmone left for repropuent of deposits was only a few shillings. Working men should guard very carefully ganises such professions.

Indeed, if a bank offered much higher interest on deposits than other banks in the same line of business do, it would probably mean that depositors would be very unwise to put their money there. The bank would be doing more hazardous business than other banks, and the high interest would mean than other banks, and the high interest would mean depositor would have us control even, and to which he would be foolish to let his money be exposed.

International Trade.-From what we have said of bills of exchange, it will be easily understood that a trade conducted with them tends to become essentially barter of goods for goods. To take a simple case: An English merchant, A, ships £1,000 worth of biscuits to France to a correspondent, X; while another Frenchman, Y, ships £1,000 worth of wine to another English merchant, B. Now, it would be ridiculous for X to send A £1,000 in sovereigns, and B to send Y £1,000 in sovereigns too. X pays A by "accepting" A's bill on him, and B pays Y by "accepting" Y's bill on him, and meeting them when required-the bill being an order to pay the equivalent of £1,000 now, at a certain future date '(as was previously explained). Then if Y's bill is made payable to A, and X's to B, the two bills will, as it were, cancel each other, and we shall really have £1,000 worth of biscuits exchanged for that value of wine. Exports, that is, pay for imports. This balancing of accounts goes on daily, and without any

clear consciousness of it on the part of those concorned. It might very well happen that A did not at the moment know anyone who wanted to make my remittance to France. In this case he would sell his bill to a bill-broker, who would find some other person who slid, and resell the bill to him. Now suppose at any time the amount of goods sent from England to France is less in value than that sent from France to England. Then, specie unist be sent from England to pay the balance. But there is risk in this, and insurance must be paid as well us freight. So there will be an increased demand in England for bills payable in France (primarily to avoid sending specie), and the sum to be said for each will rise. It will not rise beyond the amount which will be saved by sending bills instead of specie, but it may rise to that amount. Meanwhile, there will be more bills on England offered in France than are wanted, and so they will go to a discount. When, however, the inports and exports between nny two countries are just equal in value, "the exchange is no par" -- that is to say, by paying flown so much gold in one of the countries, one can buy the right to receive the same anount in another country -- the right being expressed by a bill.

In fact, of course, private persons do not themselves ship gold when they cannot get bills. The banks create the bills for them, and if they carnot meet their liabilities in any other way, slip gold conivalent to the value of the bills. Moreover when bills on a country are likely to be at a preminm, it will pay nerchants to pash the sale of their goods there, to get the advantage of the preminm: and when they are at a discount, the surplus may rasily be worked off through some adjacent country. Thus, if bills on London were at a discount in Brazil, but Argentma were innerting English goods largely, the buyers in Argentina might very likely arrange to buy Brazilian bills on London, and paypart of their debts with them. Between gobbusing and silver-using countries, we must note, there can be no par of exchange.

We need not therefore be abstraced at "a diam of pold in return for foreign raw materials." This was one of the terrors, held out by supporters of the old "Mercental Systems." But II impacts pay the material support of the support of the collection of the the only rawon why it matters is, that If it is returned to the property of the collection of the collection outflower. But no so an a gold gets searce in a country, prices full, and more gold causes in to lump post—pairs are more than one of the collection.

It must be noted, however, that the imports of

England are annually nearly one-fifth more than her exports in value. So it may look at first sight as If we are paying the balance out of our national capital. But the balance is accounted for chiefly thus: (1) The values of the imports in the official statistics are returned plus freight, those of the exports minufreight. (2) What is much more important, the excess of imports is due to the fact that foreign countries contain a yest amount of British capital. Germany and France, of late years, have invested nuch capital abroad; but by far the largest amount of the European capital invested elsewhere than in Europe is English. Poreign governments and railway companies, and the other holders of this capital, pay interest, and, of course, do not send it in coin any more than merchants do, but in bills. The knowledge that there will be a demand for hills on Lordon sends up the premium on their in these countries, and stimulates merchnnts (us we said) to send goods, that they may have bills on which the premium will be higher when they fall due. And as England does much of the carrying trade of foreign nations, payment for this tends to be made in the same way, that is, by hills representing goods, and so by the goods them-

In Blokene's story of "Dombey and Son," Hule-Paul bars Mr. Bays, or manuter community with old-fichioned blovs, wide Mr. Toute, "Winta you are to do with your raw materials when they come to your parts in exchange for a dualn of gold." Mr. Touts, who shows not understand them matters, replies, "Could them" But in fact he was much mave nearly right time Mr. Bays. Work up raw materials, add, value to them, export them with ble increased value, and let the "chain of golds"

That international trade is essentially barter is the first principle to be grasped. The second is, that such trade rests mainly, though not entirely, on International division of labour. Each country tends to produce what it Is hest fitted for; but It produces other things besides either because it would be too expensive to import them from the countries where they can be more cheaply produced, or because capital and labour do not move between countries with perfect freedom. Investors do not like to put their capital in countries they know little about and cannot watch carefully. Not much more than an eightle of English capital. probably, is yet invested abroad; still English capital goes abroad for more freely than that of my other nation. Labour, two, emigrates far less freely than capital; indeed, extensive emigration is a matter only of the last half-century, and of most of it we may safely say that the emigrants

APPLIED MECHANICS.

wends not have gone abroad if they could have made o comfortable living at beme. Were it not for this heatition namey capitalisis and abources, capital and labour would speedily neigrate to the most fertile countries, and the rest of the would would be depopulated. This is hardly likely to

cotor. House, countries ofton produce things that are produced elements error much more chengly, and, what is more remarkable, import goods they could pro-duce more chough? themselves. Thus, during the most cetive period of gold-mining in Australia, timber for pit-props wes notually imported from timore for pil-props, wes actuatly imported trees.

Nerwey, though there was pleaty in Australia.

Better was imported from Ireland, though meeh better better could have been made in Australia.

The reason was that Australia produced gold, and that it was more profitable to pot all her available labour end capital into gold-mining, and to buy wood and butter with the results. Some of the West Indh. Islands, again, coeld grew more cern per nere then most of the corn-growing districts of the United States. Bot they can grow feels so mech better then the United States can that it pays better to concentrate their labour and capital pays better to concentrate their labour and capital on fruit-growing and import cern. A few years ago Pertegal experted petators and tensators to South Africa, which is a mech mere suitable country for growing them. The reason was that people in South Africa hed still mere profitched em-

pleyments for their labour and capital than market pleyments for their labour and capital than market gardening; and these happened to be good and quick commanication between the cocatries. It is very likely that one reason why fereign fruit and eggs compete se largely with English fruit and eggs is that the staple industries of England effort more prefitable employment for capital than gardening or poultry-rearing. . It must be enrefully noted that the edvantage

of international trade is primarily a consumer's ... advantage. People ere rather opt to look only at the question whether producers profit by it. The cetten-operative thinks it hard that English cotton goods should be underseld by fereign ones; the ogriculturist, that English grain is hould be underseld by American. Both forget that all the com munity are benefited by getting their goods cheaper, both directly and indirectly. Real wages are higher, there is more wealth to save os capital, and so more possibility of employment for inbour; though, no doubt, certain special trades may suffer seriously front fereign competition. But there ere many other causes—the invention of new muchinery, for insteace, and consequent over-production— from which a trade may softer quite as much or

APPLIED MECHANICS.-XVI.

[Continued frees p. 02]

EMPRINGE (CAMPAINS PROF. S. CZ]

BENDING OR PLEXUEN-STRONGTI AND STIFFNESS
OF BRANG-PRACTICAL BULES, ILLUSTRATIONS,
AKER EXAMPLES (continued).
THE important rules given in the last lesson will be
obster understood after working some exemples
which shall be of as practical a nature as possible.

NUMERICAL EXAMPLES. A beam of Baglish oak 25 feet long, 10 inches broad, and 14 inches deep, is supported at the ends and loaded at the centre: find its safe load, using 6 os n factor of safety.

· W=exkx Mt; in this case, $W = \frac{1 \times 6000 \times 10 \times 10^{3}}{25 \times 10}$, or 40042 lb.

Hence the safe lead is-

41642 - 7223-6 1b.

 A pitch-pine beam 30 feet long, 15 inches deep, and 12 inches broad, is fixed at the ends and loaded uniformly: find the safe total load, using the same factor of safety as before, Answer, 24450 lb.

3. A floor 20 feet square is supported by a red plue beam, which is fixed into the walls. Supposing the beam to support the whole weight, that the flooring, etc., weight 20 lb. per square feet, and that the room to no commodule 120 persons, weighing on an average 120 lb. each—find the proper section for the beam, its breadth boing two-thirds of its depth. Factor of rathy as before. 400 × 20 + 220 × 120 == 22400 Tb.

This is the safe lead; hence, the breaking-lead is-22400 × 6 × 134400 lb. Our strength-rule gives us the equation-

134100 = \$ × 5550 × \$rl × d1,

131400 × 20 × 12 = 49, whence d = 1444 inches, and b = 942 inches, the section required. 4. In the last example, if the factor of safety for the dead load is 6, and that for the live load 10,

find the proper section for the boum. Answer, depth, 16-04 inches; brendth, 10-69 inches 5. A timber been is supported at points 12 feet apart, and leaded with weights of 10, 12, and 8 cwt. at points 2, 5, and 9 feet respectively from the lefthand support: find the bending-moment at a section midway between the supports. If this bendingmoment were produced by a lord at the centre of the beam, find the amount of that lead and the proper size for the beam, it being of teak, and its brendth 2 of its doubt. Factor of safety.

Explaination.—The bending-moment at the centre of the beam is found by taking the algebraic sum of the moments, about the section at the centre, of the forces to one side of that section. In this case, there are only two forces to the right of the section, and hence it will be easier to work from that end of the beam.

The supporting forces having been found by the method explained at page 282, Vol. VI., the bending-moment required is—

19; × 6 - 8 × 3 cut.-feet = 76 - 21 cut.-feet = 52 × 112 × 12, or 69,5*8 pound-meter.

The conivalent load at

the centre is 1911 3 lb...

and the safe section

for the beam is of dooth 6:63 inches and breadth 4:14 inches. ti. A wrought - iron beam is of the section shown in the fourth figure of Table L. the breadth b being 8 inches, depth d 12 inches, and thickness of metal everywhere 1 inch. If the beam is 25 feet long, and supported at the ends. find the greatest unlformly - distributed load it will bear with safety, safe f being 9000 Answer, 22714 lb. $(1 = 568 \cdot 6).$

7. An irru locum is
of the shape of a hollow cylinder, the
state dimension being to
inches, and thelenes of metal. I lends. If
the beam is fixed
firmly into two walls
30 feet apart, find the
creates uniform load

it will bear with safety, safe f being 9000.

Answer, 22381 lb.

A beam of the same material is semicircular in section, the circle being 8 inches in diameter, It is supported, flat side downwards, at points 12 feet apart, and loaded uniformly: find the greatest safe load.

Answer, 6120 lb.

STIFFNESS OF BEAMS-CHANGE OF CURVATURE-

DEPLECTION-EASY RULES.

The strain in the case of a leaded beam is such that the beam if originally sarright becomes carred, and if originally carred has its currenters formersed or diminished necessiting as the added leads not with or against those already present. The student probability understands roughly what is meant by "curvature." The multientation, it may be a support the state of the student protection of the student protection when the state of the circle agreeing most nearly with the curve at the point indicated.

In Fig. 93 a small perion of a bent or curved bram is shown, the curvature being greatly exaggerated. Take 0 of (measured along the neutral line) = 1 inch, and 0 λ = 1 inch; this will simplify our expressions. From the similarity of the sectors of c and A no it is evident that $\frac{\sigma}{\sigma} = \frac{\lambda}{\lambda} \frac{n}{\sigma}.$ Let

oc be called τ (the radius of curvature), then $\Lambda C = \tau + 1$. Also, $\Lambda B = \Lambda N + NB = 1 +$ the strain at 1 inch from the neutral line.

It has already been shown that the stress at 1 inch from the neutral line is $\frac{M}{1}$; and since $\frac{\text{stre-s}}{12} = \text{strain}$,

the strain at A n must be $\frac{M}{D_1}$, and A $B = 1 + \frac{M}{D_1}$.

Hence, $\frac{O}{O}C = \frac{A}{A}B$ may be written—

$$\frac{1}{1} = \frac{1}{1 + \frac{1}{M}}$$
; $Ve^{\alpha} \frac{1}{k+1} = 1 + \frac{1}{M}$ or $\frac{1}{k} = \frac{1}{M}$.

In other words, a beam originally straight takes, when acted on by a bending-moment x, a curvature whose amount is obtained by dividing the bendingmoment by the product of the modulus of clasticity of the material, and the moment of inertia of the section of the beam at the point specified.

If the beam was originally carved to a radius r_0 , the addition of the bending-moment x produces a change of curvature:—

$$\frac{1}{r} - \frac{1}{r_0} = \frac{M}{EU}$$

DEFLECTION OF BRAMS.

It is evident that the amount a beam "deflects," or dips below the straight line at any given point, depends on the curvature of the beam. The exact connection between curvature and deflection, and the method of farding the latter from the former, would take us somewhat beyond the scope of these lessons, and a slight acquaintance with the integral amount of that load. Safe /, 2000; E, as in Excalculus would be necessary to understand or work sample 8.

out the results. Taking, however, the case of a beam supported at the ends and loaded at the middle, the deflection, 5,

$\delta = \frac{WP}{48Ei}.$

The deflection of any of the beams referred to in Table II, is obtained by multiplying the right-hand

there is found from the rule-

side of this equation by the proper value of D, given in the fourth column of that table. For beams of rectangular section, the simple

rule---* * * D × 5 × WI

may be employed, values of 8 being given in Table III. . The student should work out the following

examples carefully :-ENAMPLES.

Find the deflection at the centre of a beam of English cak 20 feet long, 15 inches deep, and 10 inches broad, supported at the ends, and loaded at the centre with a load of 5000 lb.

Answer, 1.19 inohes. Find the greatest deflection of a pitch-pine heam 25 feet long, 14 inches deep, and 9 luches broad, fixed at the ends, and loaded at the centre

with one-fifth of its brenking-load. Answer, deflection, 199 inch. load, 15335 1b.

3. A solid ovlindric wrought-iron shaft, 3 inch 3. A solid oylindrio wrongut-true come, o the in diamoter, is supported at points 16 feet aport, and loaded at the centre with a load of 400 lb. Find the deflection of the shaft, due to this load and to its own weight. A cubic inch of wroughtiron weighs '28 lb., and n may be taken as = 28000000.

Note. - Find the deflection due to each load ' separately, and add the results to get the total Answer, 844 inch.

 A tenk-beam, 20 juches square, is fixed firmly into walls 30 feet apart, and loaded uniformly. Find its greatest safe load, and the deflection under this load. Factor of safety, 5.

deflection, 496 inch. 5. A wrought-fron heam of T-shaped section has the following dimensions:—Breadth of top flange, 5 inches; depth of web, 6 inches; thickness of metal everywhere, 2 inch. The heam is 16 feet long, and fixed at the eads; find its deflection under its greatest safe uniformly-distributed load, and the

. Answer, safe load, 192400 lb.

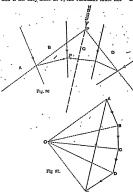
Answer, deflection, '0816 inch. safe load, 45866 lb. (1 = 36-97).

THE DETERMINATION OF THE RESULTANT OF A

NUMBER OF FORCES ACTING NOT THROUGH ONE POINT - FORCE AND LINK POLYGONS -INTRODUCTION TO GRAPHIC METHODS OF We have already pointed out that when a number

of forces not at a point, they may be regarded as . simple vector quantities, and their sum is readily obtained by the "polygon of forces." If, however, the forces do not not through one point, they may no longer be regarded us of the same simple order of vectors, and the determination of their sum or resultant involves a more complicated construction. We can best explain the matter by taking up one case. In Fig. 96 we have drawn four forces which act in one plane, but whose directions do not pass through one point. In Fig. 97 the force-polygon sese forces is drawn, and the mornitude and direction of the equilibrant (or resultant) is shown by the line A.B. The difficulty, however, now faces us-where does this resultant act? Here, then, we have a new condition introduced, and heave our simple-polygon law is not adequate. We require the ald of what is known as the "link-polygon" as well as the force-polygon. We have already given (page 89) the analytical conditions for the equi-Ilbrium of a number of forces acting like those in Fig. 96. The same conditions, stated in the lauguage of "graphics," are two, viz .- (1) The force-polygon must be closed, and (2) the Mak-polygon must be What do we mean by "link-polygon"? In

answer, we proceed to explain how it is drawn. Choose any pole, or point, o, near the force-polygon, and join each corner of that polygon to the pole. This we have done in dotted lines, but the student can use different coloured inks instead. Before going further, notice how we have lettered our Each space between two forces in Fig. 96 has a letter assigned to it, and we speak of the force AB, meaning that force which separates the space A from the space B. In the force-polygon this force is represented by the line AB, each letter bere standing at a corner or apex of the polygon Now, to draw the link-polygon, choose any point on the force An (Fig. 96), and through the space A draw a line parallel to oa in Fig. 97, through somes R a line namillel to o R, and meeting the last, line on AB, through C a line parallel to o C, etc., nutil each space has its dotted line drawn in it. Now our link-polygon must be closed if the forces are to be in equilibrium; and if we want the resultant, we must suppose that with the help of that resultant—when found—with its arrow reversed, the forces are balanced. Now close the link-polygon by producing the lines in A and B till they meet at p. the resultant must not



through the point r thus found. Hence we have only to impose a force whose magnitude and direction are represented by A x in the force-polygon, at the point x, and our work is complete. The student should follow this work carefully; for it what we have now done is throughly understood, no great difficulty will be experienced with other and more complicated occursions. The following statements should be carefully noted and put to the test by the student:—

(1) It does not matter what point on A is chosen to begin the link polygon

(2) It does not matter what point in the plane of the forces is chosen for the pole o, except that if chosen in certain positions the drawing is of awkward dimensions.

The result will be the same if different positions of these two points are tried; and a point (not necessarily the same point) on the resultant will be obtained in each case. No amount of reading will ever enable the student to understand this beautiful subject, which we have only-space to introduce. It is very much used now, specially in connection with the determination of the forces acting on the different blees of structures

> such as railway girders and roof-trusses. In the few lines at our disposal we will endeavour to show you how to determine (1) the supporting forces and (2) the "stress," or more properly, the longitudinal force acting on each piece of such a strueture, the loads and method of support being given. We must make the assumption that the pieces of the structure are fastened together with infinitely well-oiled pins, which ensures that the force acting on. each piece can act only along its length. First of all, however, about the supporting forces. It is usual to assume that one end is hinged, and the other supported on rollers to allow for expansion duo to heating; if those rollers move freely, the force at that end will act vertically, the rollers moving on a horizontal surface. The supporting force at the hinged end (H. Fig. 98) may not in an inclined direction which is not at present known; all we know is one point in its direction, viz., the hinge, Having found the resultant load on each "bny" of one side of the truss, by com-bining load due to weights of parts, possible snow, etc., with wind-pressure, by the parallelogram of forces, and for the other side taking simply the forces due to weights (since wind cannot act on both sides at once), our loads are now supposed found, and the "graphie" work proper begins.

do not know the force acting at the hinge H. We do know the direction of the supporting force at the other end A; hence draw a vertical line of indefinite length from A in the foreepolygon. Choose the pole o, and draw the radiating lines OA, OB, etc., as before; then draw the linkpolygon, commencing at the kings. The forces A B. B C, etc., have to be produced downwards, as shown dotted, and the corners of the link-polygon rest on, these lines as explained in the last example. Having completed the link-polygon as far as the supporting force at A, the polygon is now made to close by a line through space I. In the force-polygon (Fig. 99) draw from 0 a line parallel to this closing side; this line outs the vertical line AI is the point I, which is the last corner, or apex, of the forcepolygon. The polygon can now be completed, and

Draw the force-polygon ABCDEFGH (Fig.

99); this polygon is not yet complete, as we

the supporting feron at II is repre sented by the line I'H to the same scale to which a B represents its particular force or load. The stadent should very . carefully work out for himself such an example as

0 Fig. 16.

his, end by so doing he will learn mere the costhie by mere reading. We have not speec to go vory faily into the method of finding the "stress" figure for this trues, but will endeavour to put the student on the right truck, so that he mey complete the work without much difficulty. The ferce in each piece is supposed to eet along the piece, so that at a corner, say A, we have four ferces acting—the at a cornet, say A, wo have four ferces acting—the land A.B, the appropring force A, red the ferce due to the pash or pull of each of the pieces B and A I. If these forces ere in equilibrium, they cogks to be parallel and proportional to the sides of a polygon. Job us draw such a polygon. Well, in Fig. 59 we have already two of these sides, A and A I.I besco it is only necessity to complete the polygon, which is dene by drawing a line from n parallel to no.

(Fig. 98) and a line from I parallel to no.

These lines intorsect in the point s, and

give us the pelygon of forces, or "stresses," ABJIA fer the point A. The line BJ shows (te the seme senie as that to which AB represents lend) the force acting on the place BJ of the trues, trying either to crush it or to pull it assuder: Which of these does the force try te de l' Well, this is easily found from the polygon ABJI; for the directions of the arrowheads on AB end AI are fixed, and the other arrowheads must be concurrent with these. Hence we see that the piece B 3 pushes the point A, and that the piece I a pulls the same point; or in other words, the former is a strut and the latter a tic. Remembering that a piece which pushes with a given force at one end

pushes with an equal force at the other end, we knew the action of the piece B a at the next point BCK I, and we can proceed to draw the "stress" polygon for it, as in the case of the last point. Two

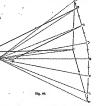
of the sides of the polygon we already have in Fig. 99, viz., Ec and B.J. The polygon when completed is found to be BJEOB; and by a similar process to that adopted before, the character of the forcewhether tensile or compressive—can be determined.

Notice that each point where lines meet in the

truss errosponds to a polygon in the stress figure, and that each line in the fermer is parallel to a corresponding line in the latter. Such figures are ealled reciprocal figures.

We have not proved to you that when the force and link pelygons are closed, the system of forces is in equilibrium. With the force-pelygon we have already denit, and shown you that if it is closed the forces would be in equilibrium if they acted at a peint. The proposition in regard to the link-polygon may be proved in the following way:—Aleng each line, such as B, of the link-pelygen (Fig. 96) introduce equel and opposite forces. This will not

introduce equal and opposite forces. This will not atter the equilibrium or want of equilibrium of the original ferces. New consider any corner, eay p, of the link-polygon. The three ferces acting there are parallel to the sides of the triangle no o (Fig. 97), and hence are in continuous. ad hence are in equilibrium. In the same



will be seen that the forces at each o parallel to the sides of a triangle in Fig. 97, and therefore in equilibrians. Hence, the whole system, consisting of the original and the superimposed

forces, is in equilibrium, the forces balancing in triplets. The superluposal force are in equilibrium, balancing in pairs; bence, the original forces must be in equilibrium.

It is a rather important proof, and the student would do well to try to master it.

LOGIC.---II.

Position for p. 254
DIVISION AND DEFINITION.

THE consideration of Species and Genera naturally leads to that of Division and Definition, as they are regarded by logicians.

The name individual is sometimes given to a Singular term, because it connot be divided logically; or, in other words, is lucarable of bring analysed into several suburdance species. or into individuals. We are metaphorically said to divide a term when we commende the several kinds signified by it, since we then distinguish many though in one. Thus, if we say that "unional" is both "man" and "brute" tie, that the term animal has those two significations), we are said to divide "ardinal" lets "man" and "brute," Herigive, then, which is thus englicable only to neommon or maveral term, may be defined as "the distinct connection of the several things which are signified by a common or mover-al term." The process which is the apposite to Division is

called Gerentisature. This prove is carried on by means of Abstraction, which is, quaking generally, the separate consideration of certain attributes of an object, the rest being left out of view. Let us take, as an illustration, our idea of any individual man. The blan include, amongst others, the several ideas of substance, lock, life, sensation, and to a on, to gether with the bleas of a particular laught, figure, commence, colour, birth, ete.- all which latter ideas are prevaler to the individual man, while the former are corner to blia and all other men. Now if we take into consideration the former attributes only, and disregard the latter, we have, instead of the idea of a particular man, that of "man" in general. In other words, we have by the exercise of abstraction generalised, ee, arrived at an idea more general or universal than that with which we started. The idea of "man" thus obtained may be generalised still further. If we leave out of the ideas contained in it that of reason, which is peculiar to man, we shall have the idea of substance, body, life, and sensation remaining which are common to man with other living beings. We thus arrive at the still more general idea of "animal", and in this Justanea we might carry the process of generalization even still further. Enough, however, loss here said to make clear what is seemed by calling Division and Generalization what is seemed by calling Division and Generalization the appeals to one another; for, as in the foract we said on the differences by which several things are albeitguished so us to enumerate cook of them by a different and ablation tunns, so in the latter we long aside the differences to call all the thines betwee remains name.

Logiclaus are accustomed to enumerate reveral rules of Division, the principal of which are these three:-(1) Each of the parts, or any number of there short of all, must contain less than the thing to be divided, i.e., must have a narrower signification. (2) All the parts, taken together, must contain twither more nor less than the thing to be divided; they must be exactly count to it in extent (3) The parts or members of the Division must be opposed, i.e., any portion of one of them must not be contained in any other. Books must not be divided, for instance, into " English," "Quarto," and "Poetical"; for if this were done, some of the individuals of each class would be contained in both of the other two. To guard against violating this law, the same principle of division adouted at its commencement must be kept in view throughout the process.

represent over transparent in process. The new of the word Deficition in Leyie is also notify horizontal for, originally meaning "marking out by boundaries," if is here employed to signify the expectations and words by which these things which we wish to distinguish from one marked from the method of the definition are discriminated from those which beader on them, this fields by their boundaries.

Logietans have commonly distinguished two kinds of definition, Nervical (nomen, a naver), which explains the menning of the term defined, and Real, which explains the nature of the thing which the term signifies. A Real definition, again, may be either Accidental or Exertial, i.e., it may either assign to the thing to be defined what may be called its areidental attributes (e.g., its causes, effects, 100porths, or other things of that kind), or give what are regarded as the constituent parts of its essence, these being the attributes which the object roof possess in order to belong to the particular species. An Essential Definition may also be divided into Logical, which consists of the Genus and Difference; and Physical, which ranmerates the parts of the thing which are actually separable. "Man," for instance-to illustrate these several methods of Real Definition -may be defined Accidentally as "a featherless biped"; Logically, as "a rational animal" ("animal" being the Genus, "rational" the Difference); and Physically, as "a natural

LOGIC: 167

existence communing or an organised body and a rutional soul." But some of these distinctions are of doubtful value.

The throught rather of 'definition are—(1) The definition must be adopted; as, it is must not be obtained in the adopted; as, it is must not be obtained in the assemble of th

OPPOSITION AND CONVERSION.

...Two Propositions are said to be opposed to one another whea, having the same Subject and the same Predicate, they differ in quantity or quality, or both. Hence there must be four different kinds

or both. Hence there must be four different kinds of Opputation. If we take the same subject and this same Predicate, we can obviously make out of them four different Propositions, which are represented by the four symbols A, B, I, and O. Thus, let X represent be subject, and Y the Predicate, we shall have the species propositions, *All X is Y, *N X is Y, *Genx X is Y, and *Some X, *V, *Sox X is Y, *Genx X is Y, *In and *Some X is X is the predicate of the proposed Hence there result the following four kinds of Opposition. *

(1) Contradictory.—Where the two propositions differ both in quantity and quality, they are called Contradictories. These will, of course, be A and O, or E.n.ed. I

(2) Contrary.—This takes place between propositions which differ in quality only, and which are both universal, i.e., between A and E.

(3) Subcontrary.—Where propositions differ in

quality only, but are both partionfir, they are called Subcontruries. This kind of Opposition, between exists only between I and O. (4) Subatternate.—This kind of Opposition is between those propositions which differ in quantity only. It may, consequently, he ofther between I A and I, or between B and O.

A control of the control of Opposition have been all down by logicians an affective to what may be infacted from the truth or falsehood of one of two op-point propositions as to the truth or falsehood of the other. These are most conveniently enumerated as four, one in reference to easily species of opposition. (1) Controlliotories cannot be both true or both false as the same time; one of them must be true.

and the other false. If the negative be true the

affirmative must be faint; ann a use neightfor be false, than firmative must be true; and vice server. This will appear manifest if we recollect that overthing (whether individual or species), without exception, must either belong to any given shass or and, must possess a given artitude or be deals out of, the properties of the Every A, as this is sometimes expressed, must be obstrued for the true of the contract of the contra

(2) Of Contention, both at the same time may be table, but summe be true. It is non conceasing that the contention of th

may, as we have seen, be both true. (i) Lastly, in Subalternation the two proposi-tions may be at the same time one true and one false, or both false, or both true. There are thus four cases which may arise, and in two of these we have grounde for inference, while in the remaining two we are without them. If the Universal perally called the Subalternans) is true, the Particular (generally called the Subalterno) is true also. If "all men are mortal" and "no men are stones" are true, so also must be the corre ding Particulars, "come men are mortals" and "some men are not stones." We cannot, however, reverse the process, and infer the truth of the Universal from our knowledge of the truth of the Particular. It does not follow "some men are mad," for example, that "all men

are mad." Secondly, where we have ascertained that the Particular is false, we know that the Universal also is false. That "some men are stones" could not be false, unless it was also false that "all men are stones." Thirdly, if, however, what we are given is the inischood of the Universal, we cannot, merely from knowing this much, say whether the Particular is trae or not. To learn that we cannot truly say that all the individuals of a class do or do not, as the case may be, possess' a certain attribute, is not to learn that we can truly say that some of them do or do not possess it. In certain cases, but not in all, the Particular is true, even when the Universal is false, Nor, lastly, are we warranted in asserting the truth of the Universal because we may be certain of the truth of the Particular. If the Subject and Predleate are "man" and "mortal," both the Subalterna and Sabalternans will be true; but the former may be true-for example, in the proposition "some women are foolish"-where the latter is evidently false.

It should be remarked, before passing from this branch of the subject, that some logiclans have refused to regard Subcontrariety as a species of opposition at all. And, speaking strictly, it would seem as if they were right, as according to the definition of Opposition above given, the subject in the two Subcontraries is not always exactly the same. In the propositions "some men are wise " and "some men are not wise," it is not really the same individual men which we are speaking of in each. We mean in the one "some men." and in the other "some other men," different from those spoken of in the former proposition. No confusion, however, need arise from following the ordinary classification, if this observation is kept in mind.

We must next consider Contextion. This, milke Opposition, which is a nares species of relation borns to one another by propositions of a certain kinh. Is a process, enturily performed, by which not proposition is changed into another, which then bears a certain stellation to the former. This will naturally, being a process of inference, lead us on to the theory and use of the Spirigarian indeed to the theory and use of the Spirigarian indeed to be the context of the

A proposition, then, is said to be converted when its extremes for terms) me transpaced, i.e., when the subject is put into the place of the predicate, and the predicate into the place of the subject, so as to form a new proposition. The name of Convertent is given to the proposition to be converted, and that of Converse to the new one which results from the transposition. Logicians differ widely as a to whether the judgment expressed by the converse is a new judgment, or insertly the old one expressed in another form; while some would treat Opposition, as well as Conversion, as a form of elementary examples of the presence of the proposition, as a form of elementary examples of the presence o

Conversion may be effected in various ways, but those principally employed in Logical treatises are

two-Simple and Per Accidens.

Simple conversion is that in which both the quantity and the quality of the converse are the same as those of the convertend, in which case, of course, the operation does not change the symbol to the proposition of the converted of the proposition of the converted of the proposition of the converted of the conv

We cannot, however, deal with A in the same manner. In it, as we have already seen, the prediente is undistributed. Consequently, if we simply transposed the terms, and let the quantity of the proposition still remain universal; we should have the term, which as predicate of the convertend, was undistributed, distributed when used as subject of the converse. Of course this is an operation which may actually be performed; but the process will not be illative. We are not able to infer the truth of the new proposition from the truth of the old; and this plainly, because the fact that a part only of all the individuals or objects signified by the term used as predicate in the latter proposition was spoken about, cannot warrant us in making an assertion in the former about the whole of those individuals or objects. It may, indeed, happen necidentally that the new proposition is true with a-universal subject; but this never results as a consequence from the truth of the old proposition, but depends on quite other grounds. "All equilateral" triangles are equiangular" is trae, and so is "nll equiangular triangles are equilateral"; but the truth of the latter proposition cannot be inferred from the truth of the former. Hence it is that Euclid has given a separate and independent proof. of each. It follows, therefore, that in converting A we must, in addition to transposing the terms, change the quantity from universal to particular. leaving the quality unchanged. This species of conversion has been termed by logicians Conversion .

per Accident. The name has been obseen because this is not really a conversion of the universal per as, but by reason of the accident of its containing the particular. In other words, the particular to which A is thus said to be converted is not, strictly speaking, the converse of the universal A at all, but of the particular I which it contains, i.e., whose

truth is implied in its own.

Neither of these methods, bowever, will enable us to convert O. Whichever of them be adopted, the subject of the converted, which in it is undistributed, would in the converse, being there the predicate of a negative, be distributed; and this predicate of a negative, be distributed; and this would, for similar reasons to those above given against the simple conversion of A, be useless for the purposes of inference. O, however, may be converted simply by regarding it as I. This is done converted snisply by regarding it as I. This is done by considering the negative as statecht of the pre-sideric increased of by the copula. Thus, in "some why possess wealth are not happy," if we consider the predicate as "not-happy "instead of "bappy," the proposition may practically be regarded as I, and then converted simply. This is called conversion by Contraposition.

It should be noticed that Singular Propo are, for the purposes of conversion, regarded as Universals, innamuch us their subjects may be said to be distributed, being used to stand for the schole of what they can be used to signify.

The result then is this: E and I are converted simply, A per assident, and O by contraposition.

The complete understanding of the nature and theory of Syllogism, and its practical upplication, may be said to be the chief aim and end of Logic. may he said to be the shief aim end end of Logic.
We have shready seen that the shird operation of
the shind is Reasoning, and that this, when capict into a certain form hald down by logiciane, a Syllogium. We impose Arabbishop Wheeley
daffaition of an Arymense, Which is "an expression
'lis which from something hald down and gentred as
troe (i.e., the Premissely, constraining close (i.e., the troe (1A, too Fremses), constaining case (1A, too Fremses), conclusing beyond this must be admitted to be true, as following becessarily [resulting] from the other.* The sums writer defines a Sylloyiaw, which is an argument stated in a regular logical form, as "an argument so expressed that the conclusiveness of it is manifest from the mere force of the expression," i.e., without considering the meaning of the terms: e.g., in this syllogism, "Every Y is X, Z is Y, therefore Z is X," the conclusion follows from the premises, whatever terms X, Y, and Z respec-tively are understood to stand for.

Reserving, however, for the time our explana-

tion of the analysis and rules of the Syllogism, we will now briefly mention, to show their groundlessness, a few of the common erroneous impressions abroad upon the subject.

Some persons have considered it a conclusive manuse pursons nave considered it is conclusive argument against the utility of Logic in improving the reasoning powers and enabling us to reason better, to any that numbers reasoned very well before over Logic was heard of, and that still before over Logic was heard of, and that exester numbers are in the habit of reasoning correctly now who are ignorant of even its fundamental principles. This is an objection to the study of Logic which, when reflected upon, must appe nbsurd. It might just as reasonably be said that a science of music was useless, because mony parsons are profedent in music who have never been scientific-

ally taught, and who are wholly unacquainted with its principles; or that grammar may safely be neglected on the ground that all persons can speak, and many even grammatically, without ever having been taught it. Indeed, as Archbishop Whately remarks, the practice in any process respecting which any system has been formed, not only may exist independently of the theory, but must have preceded the theory. There are others who consider that the method

of reasoning by means of the syllogism is a peoulic method, and that there are other methods differing from it which may often be more conveniently from it which may often be more conveniently employed in reference to particular solpicats. This is a mistake. Syllogistic reasoning is not a pseuliar form of reasoning, but is (with the possible excep-tion of Induction, which we shall afterwards con-sider) the one form to which all correct reasoning may be reduced, or in which it may be exhibited. The reasoning process is in every case, no matter what may be the subject-matter on which it is em-ployed, substantially the same. Quite as reasonably ployed, substantially the sense. Quite as reasonably night one say their grammer was a peculiar fanguage, and that men might speak correctly without speaking grammatically. Logic, in fact, in reference to the ryllogistic process, is not as art or solence of reasoning, but the urt or solence of them. Other persons have stringely supposed that, when the logiciant stenders have all reasons and the content of the process and the sense a

the logician teaches that all correct reasoning next be capable of being reduced to the syllogistic form. be means to convey that no one can use corre arguments, nnless he states them severally at full mgth in this particular form. As well, to borrow rehbishop Whotely's illustration, might it he supposed that when a chemist teaches as to analyse and residue a compound substance into its simple elements, be means that we should never use it for any purpose without repeating the notoal process of analysis, or that "to speak grammatically " means to mars every sentence that we atter.

METEOROLOGY .- II.

[Continued from p. 91.]

THE TEMPERATURE OF THE AUR, ITS MEASUREMENT AND DISTRIBUTION.

Is many respécts the primary and most important of meteornhogical observations is that of the temperature of the sir, In supplementing the temperature of the sir, In supplementing the language of the sir, In supplements of the language of the sir, In supplements of the language of the sir, In supplements of the language of the language of the sir, In such that the sir, In such that the sir, In such that the sir that t

A rough kind of thermosopes in common use is that known for more than a century as the complon-plass or eterm-plant. This consists of a tube containing some air, with a mixture of emplor, potassium nitrats and ammonium olboride partly dissolved in alcohol and water. If the mixture of the containing the co

transverticy game. Security of the hardward of the Temperature is measured, and not mercly inTemperature is actions forms of the hardward control of

The advantages of meroury are its high conductivity as a metal and its low specific heat, which render it very sensitive, its regularity of expansion, and its high boiling-point. As it freezes at 5-40° (F. or C.), its indications in polar climates are not treatworthy, so that alcohol is still employed in whistness therefore, therefore, the still employed in register the greatest degrees of cold.

In 1714 Fahrenheit adopted as zero (O° F.) the temperature of a mixture of ice and sait, which he believed to be the greatest possible cold, and toobblood-heit arbitrarily as 24.° This made the freezing-point 8°, and these large degrees being attravarial situided into four, the freezing-point became 32° F., blood-heat 90° F., and, the scale being continued, the boiling-point 212° F. This

"Instruments having names terminated in "-meter" (µrrpos, mēirōz, measure) are more exact in their indications than those terminated in "-scope" (#conés, sköpēč, I observe).

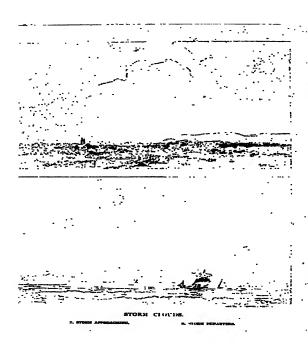
scale is still in general use in England, and its lowzero (owing to which negative quantities rarely occur in temperate climates) and its short degrees. giving more accurate results, render it the favourite scale of meteorologists. In 1730 Réaumur introduced the scale still popular in Germany, with freezing-point zero (0° R.), and boiling-point 80°: in 1742 Celsius took '0° as the boiling point and 100° as the freezing-point; and this scale, inverted by Linneus, and known as the Centigrade, is now in general use abroad and in chemistry and physics. The degrees of the three scales being in the ratio of 9° F .= 5° C .= 4° R., to convert readings in C, to R.: multiply by 4, and divide by 5; vice versa, to convert R. to C. multiply by 5 and divide by 4: to convert C. or R. to F., multiply by 9, divide by 5 or 4, as the case may be, and then add 32; or to convert F. into C. or R., begin by subtracting 32. multiply by 5 or 4, and then, in either case, divide

Thermometers have their freezing-point fixed by immersion in melting snow, and tiefer boiling-point by exposure to the vapour of water boiling under a standard harmontic, pressure of 29900 in. in the latitude of London. They can be tested at Kew Observatory, and no space of ten degrees on the scale sloud; be more than 0.9° wrong. "Physicaement of sero" is, a defect of in the readings due to ment of sero" is, a defect of in the readings due to the bulb, and necessitates a simple sering at. Instrument of the bulb, and necessitates a simple sering at.

more value of a control tropic to be recover, especially as the control tropic to the control tropic to the control tropic to the control tropic trop

John Ratherford's minimum thermometer (Fig. 2), invented in 1700, is the pattern in common use. It is a horizontal spirit thermometer with the build below the total, and a light preclaim index in the liquid. When the tomperature rises the spiritows past the index; but in failing explining attimetions past the index; but in failing explining attimements in the spirit of the spirit of the spirit.

It is now the rule in England to take the reading of both maximum and mumnum thermometers at 9 p.m. daily, and to take the mean of the two readings as the average or mean temperature for the day, beginning at the previous midnight. Thus



it is agreed to employ the civil, not the astro-nomical, day. Similarly, though "the only logical subdivision of the year, is into 73 periods of five days each," for ordinary purposes monthly

(4,226,222,22) Ple. 1.—Maximum Tennocompus.

means, f.s., averages of the 28, 29, 30, or 31 daily means in a month, are employed. To obtain a continuous record of temperature the photographic thermograph is need, a pl vacue (Fig. 5).

90 Pic. 2.—MINIMUM TREEMOMETER. dram revelving by clockwork, either of on cirhubble introduced into the column of moreury, or

of the space obeve the column. The tracing se obtained is termed a thermogram. A very difficult problem is how to place or termometers to obtain the tree temperature of the open air. For isolated observations a eling thermometer, tied to a string and swang round the head, gives accurate results; but for continuous observations some form of screen to exclude the offects of radiation is desimble. That

exclude the offects of radiation is desimble. That most used, though rather small and confused, is , Mr. Thomas Stevenson's, a wooden box 23 in. long, 4 in. inroad, and 18 in. bigh, double-louwed on oil its sides, open below, with legs so that the thermomoter-bulbs are four feet obove the ground, the whole painted white, and, if possible, standing on an open grass-plot (Fig. 8). The sun's rays are practically our sole source of heat? but their notion is not, in the first instance, to warm the air. Just us a glass fire-screen stops the "dark" heat rays from a fire whilst o gle window stops but little of the san's heat, so the atmosphere and especially its moisture-Inden lower layers, while largely diethermanous to the direct solor radiation, stops and is heated by the "dark" mys from the earth. We require instruments, therefore, both to measure solar and terrestrial radiation, neither of which wants is very satis-

factorily supplied. The length of time during any one day in which unobscured, sufishine occurs is readily measured by J. F. Campbell's sanshine-rocorder, a very simple instrument (Fig. 4). It is a glass sphere acting as a burning-gloss on a strip of prepared earthoard divided like a watch face, the s." Dr. Haughton calculates the heat received from the in-terior of the earth at war of that repetved from the sam.

length and intensity of the scorehing giving the time the sun skines. It gives, may be estimated either by Herschel's actin

bolb - tabe filled with nn ammoniacal rolation of conper, or, oe It is w more comthe black - bull thermometer in

in Ruitain exposed four feet above the ontally, with its bulb tothe

wards south-oast, and the maximum from the mexi-

This is usually 4 Fig. 5.—STEVENSON'S THURSDATTER.

by it is taken as the colar radiation maximum In very dry-climates, temperatures above 212' may thus be recorded, more than 100' occurring even in Britain. Terrestrial radiation is measured by a



Fig. 4.—Campucac's Serv m thermometer with its hulb just level with the tips of the grass. Except in very wet fogs, such o thermometer will give lower readings than .

that in the series.

"The amount of heat received from the son increases hour by bour from his rising until noes, and then decreases again till susset, while all right long we receive no heat at all from-him. The

radiating power increases almost pari passu with the increasing heat, but cannot quite keep pace with it, and so the day grows warmer as it wears on. The heat received begins to decrease when noon is



passed, but the amount given off does not equal that received for about two hours, and, accordingly, ' the hottest part of the day is about 2 p.m. The coldest is just before sunrise, because then the influence of solar heat has been withdrawn for the longest possible period, while the earth all the time has been radiating heat out into space. If we apply a similar train of reasoning to the yearly period we shall understand how it is that the hottest month in these latitudes is not June, but July, and the coldest not December, but January. The common saying 'As the day lengthens the cold strongthous 'expresses this fact."*

So dependent, however, is the diarnal range of temperature upon terrestrial radiation that it is Januar

Fig 6.-Syxoptic CHARTS SHOWING I-STREETS FOR JANUARY AND JULY.

barely perceptible either in cloudy weather or on the open sea under the equator, whilst, as we might expect, it is non-existent during the molonged "night" of polar regions.

When we take into consideration the various * R. H. Scott, F.R.S., "Elementary Meteorology."

p. 144), we can understand that the isotherms, or curves uniting places having the same temperature, will not be simple parallel latitudinal lines (Fig. 6). Of these causes the chief are those to which we have already called attention, the irregular distribution of land and water, the specific heat of water being five times that of dry land, the radiating power of water being less than that of land, the action of winds and ocean-currents, and the latent heat of water. In passing from a solid to a liquid form water requires, merely to liquely it, without raising its temperature, as much heat as would suffice to raise the same bulk of water (when already liquid) through more than 142° F. Thus to melt a layer of ice only 12 inches thick requires as much heat as will raise a stratum of air 800 feet thick from . 32° to 38°. The same amount of latent beat will be liberated on the return of the water to the condition of ice, thus moderating the rigour of the cold and prolonging the antunn in high hillindes just as the melting of the ice delays the spring. From these causes it follows that hand near the equator raises the mean temperature or deflects the isotherms polewards, whilst near either pole it

local causes modifying temperature (see Vol. L.

lowers temperature, or deflocts isotherms towards the equator; and, conversely, equatorial oceans lower, and polar oceans mi-a the mean temperature. (% Map of the World with Isotherms, Vol. 1J., opposite p. 164.)

The constant action of occan-currents in the transfer of bent was described in our lessons on Physical Geograplay (Vol. I., pp. 264, 265), and the less constant action of atmospheric currents or winds, to which we shall have another occasion of referring, on pp. 145 and 146 in the same volume. "Without occon-currents," says Dr. Croll, "the globe would not " he habitable?

We cannot here trace the course of the various isotherms aeross the globe, but

it should be remembered that to form any adequate notion of the annual distribution of temperature, it is necessary to notice not only the annual means, but also the winter and summer extremes, as these make the difference between equable or insular and extreme or continental climates.



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ATMOSPHERIC PRESSURE: ITS MEASUREMENT AND DISTRIBUTION.

Actual weighing of vessels, when exhausted by an nit-pinup and when not so exhausted, will copyince us that air has weight. Thirteen cobic feet of air weigh about 1 ib. avoirdupals, so that the air in Westminster. Hall has been coloulated to weigh nearly 54 tons.

75 tone Having weight, the atmospheric ocean of un-known depth, at the bottom of which we live, necessarily exerts pressure-a pre-sure transmitted like that of other fluids equally in all directions, and therefore generally counteracting itself, so to say, and not perceived by us. If, however, we imitate Torricelli in his experiment of 1613 (see Vol. I., pp. 142, 143) by inverting an exhausted tabe over a liquid, we relieve part of the surface of the liquid trom atmospheric pressure, and the liquid will rise in the tube, forming a column the height of which will depend on the specific gravity of the liquid, whilst its weight will be equal to that of a column of air of the same calibre. Atmospheric pressure is about 147 lb. to the square inch, a cubic inch of mater weighs 252 6 grains, and one of mercury 13-59

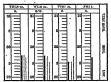


Fig. 7.—Builty New Harmsterms (herent. Coverated to excited and reduced to 32 day. F. The black-lines show the height of the hormonder at 1 evic sadiests the extreme variations during yesterlay and low previous days. The install below above the direct

times as much. Thus a column of unter 34 feet highor one of mercury 30 inches, will counterbalance the atmosphere. This is the principle of the farmacter, as Torricell's instrusees twas mused by Robert Boyle, and Ructualizins in the height of the mercury in the barometer represent fluctuations, variously produced, in the local pressure of the atmosphere. To measure this verying atmospheric pressure, the baroneter is graduated, proferably on a brass scale, into inches and twentieths; but, as all readings at each-level will range between 26 and 32 inches, it is unnecessary to have it graduated through the whole length of the tube. For more accurate readings the small morable scale, called, from its inventor, a praintre.



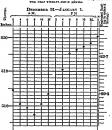


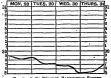
Fig. 8. - Fines Bat omersic Report.

is attached to the barometer. Its principle is that a divisions of the barometer scale are equal to s+1 divisions of that of the vernior. English barometers are divided into two orbits as of un inch, so that 21 of those being equal to 25 divisions on the vernior, one of the former spaces is two-thousandths of an inch larger than one of the latter.

As the mercury in the baroquetor will expand when bacted, the resulting has to be "corrected for temperature" or "reduced to 32" by calculation, or notice by the use of previously embanted tables; and, similarly, it has to be "corrected for militade such similarly, it has to be "corrected for militade such similarly, it has to be "corrected for militade such similarly level as Liferpools, as the baronuclar in approximately 0-1 inch lower for every 10 feet of success. Any corrections for insulfided instruments

for each half-inch of their scale are made, as at Kew, by comparison with a standard.

Aneroid barometers, though conveniently portable and compensated for temperature, cannot be relied on for any length of time. The use of giveering instead of mercury, as in Mr. Jordan's



Daily Telegraph BAROMETRIC REPORT

The above chart represents the movement of the barometer, corrected for sea level and reduced to 32 deg. F., during the last four days ending midnight, Dec. 31—Jan. 1.

instrument at the Times office, by magnifying the scale more than ten times, shows the fluctuations more strikingly.

With ordinary barometers atmospheric pressure oan only be recorded at the various hours of observation, as in the case of the daily black lines in the reports published by the Daily News (Fig. 7) and in the two-hourly records at the Times office (Fig. 8); but there are various continuously self-recording instruments, or barographs, in use, and the curves traced by them, such as those published by the Daily Telegraph, are called barograms (Fig. 9). Tho Meteorological Office, for instance, photographs on a continuous ribbon of paper the actual height of the mercury by admitting light through the Torricellian vacuum. Another most ingenious barograph, that of King, has its tube suspended from the arm of a balance and counterpoised, so that any increase or decrease in its weight, by the rise or fall of the meroury, will eause it to sink or rise in the eistern of mercury, and to move a peneil in so doing.

There is a regular diurnal range of the barometer, largely dependent on those fluctuations of temperature which are clearly seen in the thermogram of a elear day; but, except in the tropies, it is so slight as to be altogether masked by the non-periodical or storm oscillations. The measure of the rapidity with which the mercury rises or falls is called the baremetric rate. It is usually expressed in hundredths of an inch of mercury per hour, and in the climate of Britain is low if under 002 in, and high if over 0.05 in., seldom exceeding 0.10 in. '

BRITISH COMMERCE.-IV. [Continued from p. 108.] IVORY.

THE chief sources of our ivory supplies are Africa, the British East Indies, Holland, and France. For the year 1897 the total import of ivory (teeth, elephant's, etc.) amounted to upward of 10,000 cwts., of which the value was over £420,000.

Ivory is equivalent to the hard substance known as dentine, and of which teeth are mostly composed, It is only teeth, however, that are sufficiently large to be handled with profit that are drawn upon for industrial purposes. Hence, in commerce, ivory is confined to the tusks of the elephant, the hippopotamus, the walrus, the narwhal, and the sperm whale.

The teeth of the hippopotamus, or river-horse, that are drawn upon for ivory are the incisors and the canines. At one time the capines of this animal were largely used by dentists in the manufacture of artificial teeth. They are still the hest article known for the handles of surgical instruments by reason of their little liability to take on stains, In some kinds of delicate carving, too, they are preferred to elephant ivory. The incisors of the hippopotamus are mannfactured into ladies' long. knitting needles and netting meshes.

The African elephant ivory is the best, and the best of that comes from mear the equator. In this region, though the animals are smaller, yet their tusks are larger, and the value generally depends upon the length of the tusks, insamuch as the larger the tusks, the larger the articles that can be made from them. It is supposed that the size of the tasks in the equatorial elephant is due to tho greater age of the animals, they being subject to less disturbance here than further south. Tho centre of the African ivory trade is Zanzibar, though considerable quantities also come by way of the Cape and Natal. . Caravans also transport it across the desert to North African ports, whence it finds its way into the markets of the world from Alexandria. Tripoli, Tunis, and Cairo.

Asiatie ivory is inferior in size, and is more easily . discoloured than African. While 175 lb. is not an uncommon weight for an African tusk, the largest Indian growth does not attain to half that. From Cochin-China, however, come tusks that reach 150 lb. It is only the male Asiatic elephant that vields tusks sufficiently large to have any commercial value. In Africa, the tusks of both sexes enter into "commerce, the male being the larger.

The ivory from the walrus, which is supplied from the pair of tusks that grow in the upper jaw and descend outside the lower jaw, lacks density and is far less valuable than any of the preceding. A pair

of such tusks weighs about 4 lb, and acquires a length of 2 feet. They are captured by whalers mainly on the Alaska coast, and a market is found for the bulk of the ivory in China.

The narwhal ivory is from the left tusk of Monodon. monoceros, an inhabitant of the Arctio seas. Only the left tusk of the male enters into commerce, the right being in a rudimentary state only. It reaches a length of 10 feet, is of coarse texture, and of comparatively little value in commerce.

Fossil ivory is found in Siberia and Alaska. It is the tusks of the extinct mammoth, a pair of which has the average weight of 200 lb. The defect in this ivory is its brittleness. .

With us, the chief uses to which ivory is put are the manufacture of razor and knife handles, billiard balls, chessmen, combs, piano-keys, brush backs and handles, fancy drinking cups, cabinets, and other articles. The greatest quantity, however is consumed in the cutlery trade. It is out into the requisite shapes by means of a horizontal saw, the fragments and dust being carefully preserved. This refuse, by being burnt in air-tight vessels, and so made into a kind of charcoal, yields the finest black colour. By boiling, again, it may be made into a jelly that rivals call's-foot jelly and that does not deteriorate from keeping.

The quality, and consequently the price, of ivory . is dependent on the size and soundness of the tusks, which in commerce are sorted into those of 60 lb. and upwards, those between 40 lb, and 60 lb, and those between 20 lb., and 40 lb. Below 20 lb. . they receive the name of "scrivefloes," and are devoted principally to the production of billiard balls. As to price, the African ivory, which is the best, has averaged during the past ten years £50 per cwt. Specially selected teeth, however, may bring more than £100 per cwt.

VEGETABLE IVORY.

is made from the corozo nut of commerce, the fruit of the palm-like plant Phytelephas macrocarpa, which grows in South America. The nuts are the seeds of the plant, and are somewhat similar in shape to a Brazil nut, though larger and so bard that they will break a stone used to break them. They are successfully used to imitate ivory, and are worked up chiefly by London and Birmingham turners into buttons, umbrella handles, and articles of a fancy description. The imports of vegetable , ivory are chiefly made from the countries of Chili and Colombia.

HORNS AND HOOFS.

In addition to large quantities of horns and hoofs imported yearly from abroad for use in the United

Kingdom, there is used for manufacturing purposes the produce of our own animals. The chief supplies come from the British East Indies, United States, Australasia, and France. Horn is a term applied loosely to several substances, which are really quite distinct both in structure and chemical composition. true horn being a form of hard epidermic tissue.

The most valuable horns are those from the African ox, the Java buffalo, and the Arnee buffalo of India. , Hoofs, though similar to horns, are less valuable because less easily worked, and are devoted . chiefly to the manufacture of buttons and cheap combs. The horns and hoofs that mainly enter into industry are those of oxen. Horn tips, which are solid, are used by cutlers and button-makers. The sbeaths are converted into a great variety of articles -such as drinking-cups, combs, knife-handles, shoehorns, powder-horns, snuff-boxes. Horn is easily dyed, and in this country is usually made to resemble tortoise-shell. Fragments resulting from the process to which it is subjected in manufactures are melted and moulded into different shapes, thus supplying us with bell-handles, handles of table knives and forks, drawer-knobs, and such like; or they may be subjected to different treatment, and made to yield prussic acid.

From the antiers of deer are made also knifehandles of a superior kind, and from the shavings arising from their manufacture is made ammonia, which is thus popularly called "hartshorn,"

WHALEBONE

is, strictly speaking, not bone at all. It is rather a number of hardened hairs adhering together by means of a gum. The whole from which it is mainly derived is the Greenland whale (Balaena musticetus), for which it does duty as a sieve or strainer in catching its prey, pretty much as a net does duty for the fisberman. In the whale's mouth it depends from the upper jaw, and is arranged in flat plates of about 12 feet long, 10 or 12 inches broad, and about & inch thick. In a full-grown whale the weight of these plates, which number about 300 on each side of the mouth, is upwards of a ton and a half, and they furnish at least one ton of saleable whalebone. The material usually arrives in pieces comprising about a dozen of these plates, which are first cleaned and softened by boiling and then planed into sizes according to the uses it may be meant for.

Of whalebone in this form, the chief amounts are imported from Norway; other leading countries being France, Denmark, and Holland. Modern whaling is carried on by means of large iron screw-

The qualities which confer upon whalebone its

high value are its classificity and strength combined with facchibity and lightness. It is, chiefly used for the ribs of umbrellas and purasols and stays. The filnes that become separated in planing the blades are used to make breather with, in staffing mattresses and ensilories instead of hair, and in filling fire-gravies in samener. In thread-libe strips it is used an a covering for vulpi-bandles, which is used as a covering for vulpi-bandles, which provides portions again, provide knobs for walking-sideks and santi-boxes.

PEATHERS

are used for the stuffing of beds and for decoration. Of fenthers, our imports in 1836 were of the value of £1,139,000. Of ornamental feathers France, South Africa, and the British East Indies are the largest contributors.

It is hardly necessary to mention that the queen of ornamental feathers is the ostrick feather, and the best of this class come from the back and above the wings of the living bird. These, dyed blook, famish the nounting planes or undertakers, and may cost as high a same as 2000. Prom soven to eight grinnes a pound is the usual price of fine with cestrick feathers. The Americans are said to be able to manufacture artificial estrick planes.

The principal supplies of ostrich faculters come from Africa, and in Sonth Africa ostrich farming for the sake of the feathers has become an extensive industry. The planness are gathered every cight unouths, and are either pindekel or ent off near the base with a slamp kalfe. The latter method is the one now generally adopted, as, though it lessens the weight of the forthers, it is not so injurious to the builty. There are many other births whose feathers are valuable as ormanents, as, for instance, the humming bird, albitross, bird of paradise, grebe, penguin, etc.

Of feathers for beds, our imports are chiefly from Germany, France, and from China.

The feathers best saited for this purpose are those of ducks, goes, and swans, on account of their dorntiness and absence from hard stems. They arrive have in bales full of impurities. To cleanse them, they are first dired, then besten with siteks, and sleved. Thereafter they are passed through but shows to destrey vernin and other through but shows to destrey vernin and other animal germs. This process also adds to their appearance.

The down of the cider duck is the most valuable of the feathers used for staffing, and in located and Norway cider duck farming is as regular an industry as ostrich farming in South Africa. The duck lines its nest with down plucked from its own breast to keep its young warm; the farmers remove a portion

of the down, which is replaced by an additional plucking. This is done three times in the year, and the result is 3 oz. of down from each nest. The down thus gathered is sorted and cleansed, sewn up into little bags about the size of a man's fist forexport, each weighing about three pounds. So fine and soft is this down that the contents of one of these bags, spread out and warmed over hot coal, are said to expand sufficiently to fill a bed big enough for two persons. Eider down, however, is not used for beds except as ooverlets, as, when lain upon, it loses its clusticity. There are many inferior imitatious of it in the market, the spurious article being detected by its much greater weight, For a bed coverlet 1! lb. of eider down is usually sufficient; made with other down, the weight would be three times greater.

PETROLEUM.

Onr imports of this useful article are very large. In 1838 they amounted to §1 million gallons, in 1838 the variety of the property of the control gallons, in 1859 to over 102 million gallons, and in 1890 to over 105 million gallons, of the occlusive value of £2,807,187. The great petroleum-pidding countries are America, and, thought at a considerable oblishance, Russla. In 1890 our total imports were 189,90,000 gallons, in 1887 185,00,000 gallons. Rock-oil and amphita are numes sometimes applied to this substances.

Bestlec the countries named, Russia and America, petrolemia is held found in this country, in Proince, Germany, and Italy. The chief parts of Russia yielding this old are Baku and Kertch. The extent to which it is present in the region of the Camecian monatans is quite minorum, borlings made having nearly always been successful. It is in America, bowever, that the petrolemia industry has reactived its highest development, and here the old is transported from the wells to the rail or ship through tubing, one pump sending the old a distance of 15 miles.

In the working of petrolaum great once has to be inken against fire, and many ingenious constructions have been devised to this end. In stering the oil, for instance, though tanks surrounded with water were sufficient protection against fire as ordinarily. Even lightning. Even lightning. Even lightning against lightning. Even lightning even unward the produced.

The crude petroleum, the petroleum as it comes from the earth, is dark-coloured and somewhat thicker than common tar. To prepare this for commerce, it is distilled and so separated from :—(1) the highly relatile and inflammable light oils: (2) the heavy oils, which are bad luminants but good for lubrienting; (3) turry substances; (4) colouring ...

eisbalmes; and (5) bad-malling substances. The products ultimately derived from the ende pottion of the control of the control of the conpolar, used as an assistancy gasolem, one as a polar, used as an assistancy gasolem, one and an al-yas lamps; apathan, devoted to different upproves; bearine, used in paints and varnishes; korosen, hmp-oll; parafila-oll, ultimately further separated into parafila and a biviscaing oil; and vasciine, which is the lightly purified residuan left after the distillation of the petrolema.

ASPHALTE 'OR BITUMEN

Alphalt, nephaltom, or mineral pitch, a smooth, a mooth, and, brittles, provenish-back substance, is imported to a considerable extent every year from French ports, and largo quantities also from the West India islands, and from Germany. It is put to write use and a for making roofs and floos waterproof; but the bulk of it is consumed in the construction of roads and pseuments—especially is this the case with that found at Val de-Travers in Switzerland. It is supposed to be origanic market decomposed under the earth's surface, water being present but in ribeart.

It takes its name from Lagus Asphaltites, or the Dead Soa, where it was formerly found in large quantities. There is a lake of it in Trinklad which prevents some striking features. For instance, at the edge the lake is hard and cold; clowrads the cautre, however, it becomes warm and soft; while at the centre it is boiling.

The Val de Travers mine already: mentioned, whose product is the best and most widely known in this, country, was discovered in 1710 by a Greek professor, DEPrinis, and resultend for a long time the only available source of asphalte. In 1888 the first saphalte parements were constructed-fin Paris, and, later, it beenme much used there for the road-ways, the authorities considering it; preferable to stones becomes in popular risings it would not farnish material for buricades. The first rival to Val de Travers and the Series mine on the Rhose, and no entered the sulfation of the Series of these most considerable to found than the produce of these mines.

In extracting the aspiralte the process of blasting is resorted to, as in the quarrying of other coke. After extraction it is broken up into a powder and sloved. This powder is then boiled in large sheet-tion boilers and converted into mastic. After boiling it is halled out into moulds, and, when coal, solidifies into blocks—each block beim about & extraction.

COFFEE

was imported in 1897 to the extent of 778,000 cwt., of which 248,000 were for home consumption, and chicory to the extent of 100,000 cwt., of which

82,000 were for home consumption. Central, America and Brazil contribute, respectively, 172,000 ewt, at £323,000, and 39,000 cert, at £190,000, the bulk of the remainder coming from the Drillish East Indies (Ceylon 13,000 ewt, at £92,000), other British passessions sending 18,000 ewt at £15,000. Of coffee mixed with chicory the main supplier is the Channell Elands.

There are many different varieties of the coffee- 'plant, but the one that supplies almost the whole of the coffee of commerce is Coffea Arabica. It is an evergreen shrub, and attains a height of from 15 ft. to 20 ft. The berries are the part that is used, and these are gathered when they assume a crimson colour. Sometimes they are picked from the plants and often they are shaken off, muts being spread underneath to receive them. They are then gathered into sucks to be conveyed to the curing-houses or, in some cases, they are washed thither down galvanised fron tubing. The first process that they . undergo is known as pulping, which consists in separating the pulp enveloping the beans. Fermentation is next allowed to supervene to remove the saccharine from the beans, which are thereafter dried. After this, various minor operations such as fanning and sizing are gone through, and then the coffee is packed in nir-tight casks or in bags, which are not so good, and then shipped.

Such is raw coffee, which before being used is saked is in hollow from cylinder, kept suring for half an hour cover a fire until the herries become hoven. This enhances the flavour of the beans and also their strength as a stimulant, Coffee is very much subject to Adulteration. Chicary is the most common adulterant, and when added in small quantities is considered by send on the interest of the flavour and to assist digestion. Figs has not also been reassed and pulsiversized and offered, as has also the date. The coffee-lenf itself is sometimes used as a substitute for rea.

The best coffee, Mochia, comes from Yenno in Southern Arthia, being shipped principally principally from the ports of Lohesta and Mocha. The high reputation attained by this coffee in Europe is said not to be due to superior cultivation or improved stook, but to the circumstance that the coffee was first shipped to India, and thence by circuitous ways to European markets, it being that two or three southern conditions was not able force it reached the consumer. Nowmant is it subject to considerable adulteration, and it is said that genuine Mocha is never seen westward of Constantinolog.

TEA

was introduced into Europe by the Dutch. There is some doubt as to the date of its first appearance in England. One account places it as early as 1615.

relying on a letter from a servant of the East India Company, wherein a pot of the best sort of "chaw" is requested. Others put the date at 1652, and in 1660 Pepys records in his diary:- "I sent for a cup of tea, a Chinese drink, of which I had never drunk before." In or about the same year a pamphlet; accidentally discovered some years ago in the British Musenni, was issued by Thomas Garway, the founder of Garraway's famous coffeehouse in Exchange Alley, and professes to give "an exact description of the growth, quality, and virtues of the leaf tea." As to its virtues, the writer of this pamphlet declares them to be "evident and manifest by the high esteem and use of it among the physicians and knowing men of France, Italy, Holland, and other parts of Christendom, while in England it hath been sold in the leaf for six pounds, and somotimes ten pounds for the one pound weight." "And to the end," he further adds, "that all persons of eminency and quality, gentlemen and others, who have occasion for teas in leaf, may be supplied, these are to give notice that the said Thomas hath tea to sell from sixteen to fifty shillings in the pound.4

In 1675, the imports of tea amounted to 4,713 lb., but the taste for it was so restricted or the price so prohibitive, that this quantity overstocked the market for seven years. Ten years later, however, the imports had nearly tripled, and in the early years of the eighteenth contary reached upwards of 90,000 lb. By the middle of the century, with lessened imposts and a growing taste for "the oun that cheers but not inebriates," the yearly imports attained the high figure of over 21 million lb., while · at the end of the century, advancing with enormous strides, they had become more than 25 million 1b. During the present century, the ten trade has never ceased to advance, and in 1897 the total imports arrived at the enormous figure of 269,000,000 lb., representing a money value of £10,400,000. Of this amount 231,000,000 lb. were consumed at home. The countries from which these supplies are drawn are China, including Hong Kong and Macao, . 28,900,000 lb., and British East Indies 136,000,000 lb., Ceylon 96,800,000 lb., and other countries 7,000,000 lb.

Formerly, our teas were drawn exclusively from Chini, and were known in commerce an elemaging to one or other of the divisions black or green tea. Green teas, soonling to IV. Yeak, comprise Yuankay, so named from a stream in the neighbourhood where this variety is grown; Hyon, meaning "before the rains," the ported of the year at which this variety is gathered; Comproder, or see slot, "hemppoat," referring to the globular form into which the leaves are visited; importal, mannel from the fair. that only the Emperor and the mandarius consume is, and consisting of the smallest and most testler of the 'light-green leaves' of the, first gathering.

"The black teas," accounting to the same authority,
"Include Dohen, named with reference to the Builatilk, where it is grown; Congon, to kning-fiving, 'Include Dohen, named with reference to the Builatilk, where it is grown; Congon, to kning-fiving, 'You have not a state of the constant of the contraction of the contraction of the contraction of the 'visite laires,' in allseion to the drown on the opidermis, of the young spring leaves. The two last are 'the finest and most expensive of the black teas."

"The preparation of green ten may be described in general terms as follows :- The leaves are gathered from the shrub, and placed in bamboo baskets;. they are then put into shallow iron pans, placed over charcoal fires, and stirred continually and briskly, the rising steam being fanned away; after this they are removed from the pans, and whilst still flaccid with the contained moisture, are placed before the twisters, on a table made of split bamboo, and therefore presenting ridges; the twisters roll them over with their hands until twisted. The leaves are then spread out and exposed to the action of the air, and afterwards returned to the drying-pans, exposed there to additional heat, and kept continually stirred until the drying is complete, when they are picked, sifted, sorted, and so prepared for packing. Black ten is prepared in the same manner, with this difference, that the frosh leaves, as soon as collected, are thrown together into heaps, and allowed to lie until a slight degree of fermentation ensues, or a spontaneous heating, similar to that which takes place in a damp havstack. . This partial fermentation of the ten-leaves darkens their colour."

In India the tea-leaf goes practically through the same processes as in China, only these processes are performed by machinery when possible and when thought to be advantageous. Astonishing as has been the growth of the tea trade as a whole, still more astonishing has been the growth of the trade. in Indian and Cevion teas. The first consignment of Indian tea, amounting to 5 lb., was sent to London . from Assam in 1835. In 1865, the consumption of this tea in this country was 3,000,000 lb., and in 1888 it exceeded for the first time the consumption of China tea-the figures being 87,000,000 lb. to 79,000,000. Still more rapid has been the advance . of Ceylon ten. . In 1880, the year in which the importation of Ceylon tea may be said to have commenced, our consumption was 115,000 lb., which in five years grew to 3,000,000 lb., the total import being 4,353,000 lb. In 1890, the imports of this tea ... reached the high figure of 42,491,112 lb., an increase of just upon 370-fold. The rapid displacement in . our markets of China teas by Ceylon and Indian

GREEK. 169

tess is assigned to different canses—to the greater strength and, noneiquently, greater economy of the latter, to the desire to announzage the industries of our own possessions, to the greater enterprise of Brittismanaged, plautations as against the slow-going, innovation-latting Chineles, and to the fact that the Chinese shused their long enjoyed monopoly by resorting to the use of adulteriants. Whichever of these causes is the correct one, the truth possibly being in a mixture of them all; the fact remains that the Indian and Ceylou test are rapidly monopolising, the Earlish markets.

The entire ten trade of Britain is carried on from London, and the centre of the trade in London is Mincing Lane. Here are the establishments of the importers, brokers, and dealers, and here all cargoes of tea are sold. The importer or merchant buys the tea abroad, shipping it to Loudon, where it is stored in one or other of the twenty bonded warehouses to await the process of sampling. . " The broker, acting for the merchant, who does not appear upon the scene, deals with the tea from the moment of its coming into the London warehouses. The great bulk of the imports are sold by public auction. Sales take place on the first four days of the week, and are carried on from 11 in the forenoon to 3 in the afternoon. Nothing can be more bewildering to a stranger than the bustle and excitement of the sale. On an average about 10,000 ohests are sold euch day. The dealer or distributor looks at all samples offered by the brokers, attends the anctions, and when his selections and purchases are made, offers the samples to the trade at all the local centres throughout the kingdom. Before any transaction is completed, the dealer pays a heavy deposit (amounting on the average to one-third of the whole of the purchase-money) to the importer, and then, before a single obest of tea. can be removed the balance of the purchase-money must be paid in cash."-Tea: its Natural; Social, and Commercial History.

There are many other aspects of this great trade that might be treated. We shall contine to mers'res, however, withiche following, from the work already guoded:—"The year 1885, when the duty was reduced to 6d. (previously it was 1s. 6d. per lb., now it is 4d.), may be regarded as a turning-point in, the ten trade. Since then its-conditions have quite altered, and new forces have come into action. The first effect of the reduction of the duty was to imagunate a paried of the laterest competition imagunate a paried of the laterest competition terms on which they transacted insignes. Instead, the property of the property of requiring cash from their contomers, as had been formerly the case, they offered extensive independent of requiring cash from their contomers, as had been formerly the case, they offered extensive independent of the property of the contomic of the property of the case, they offered extensive independent of the property of the contomic of the property of the contomic of the property of the p

kingdom. This, no doubt, stimulated a certain kind of business, but whether its effects have been beneficial is open to question. It led, among other things, to the rise of picturesque forms of trading, by which gifts of all kinds, lotteries, and systems of insurance were identified with the distribution of tea, 'Shops for the exclusive sale of tca were established. Large quantities were also distributed by the co-operative stores, and the sale of tea ceased to be a grocer's monopoly. If we may judge by their complaints, the results so far have not been particularly satisfactory to the large London dealers any more than the grocers. The reduction of the duty had, however, a more important effect. It led to the foundation of the packet and wholesale blended tea business. This trade has gradually grown in importance, and has exercised a considerable influence on the large dealers and grocers."

GREEK, -XXI. [Continued from p. 108.]

VOCABULARY,

"Aμα, at the same time, Nαυμαχία, -as, ji (ravs and together with.

'Arapra(ω, I snatch, Πελοπογρήσιος, δ. a Pelo-

'Aνεμος, -ου, δ, wind. ponnesian.

Αδριον, to morrow. Πίστις, -εως, ή, faith,

'Exrée (Lat. enāto), Ι fidelity.

Swim out.

Στρατία, -as, ή, an army,

Ennλίω, I sail from, I sail an expedition.

away. Συγχίω (Lat. confundo),
Endurios, -a. -ov. opposite. I pour together. I put

Hydoua, I lead, I believe.

Kατακᾶία, I burn down.

Κόλπος, -ου, δ, a bosom,

a ball, a top.

gulf. Τιμωρία, -as, ή, punish-Relσαιοs, -a, -or, Cristean. ment, revenge.

EXERCISE 113.

Translate into English:—
1. 'Η στρατία αύριος έκπλεύσεται (έκπλευσείται).
2. 'Ανεμος βόβρας ένθυτιος τη στρατία έπνευσεν. 3.
Έν τη γαμαχία τη έν κόλπως Κρισαίω οἱ Πελοπουνήσιος

EVEROUSE 111.

. Translate into Greek :--1. The army safled away. 2. The army will said away. 3. The north wind blows against the nrany. 4. All the winds blew against the expedition. 5. The addiers thought they should run to the doors.
6. You weep for the unfortunate, 7. You will weep for the unfortunate. S. The fees will fice. 9. Keep ing company with children, then wilt play. 10, Good men play, and are yet in carnest. 11. The foce will put the make of the soldiers into confusion. 12. The city has been burned down by the onemy. 13. The soldiers think that the enemy will been

VERDS IN -- WITH THE PRESENT STEM STHENGTHEND

We have already seen that the present stem of several verbs is strongthened; which strengthguing, however, does not externi beyond the present and imperfect. Be-lifes the strengthening by a consomet, and the lengthening of the stem-vowel, there are others which must now be set forth.

1. Verbs whose Pure Stem in the Present and Imperfect to strengthened by the insertion of a before the termination.

Observe that Salso lengthens the stem-vowel a into art (hadre, a into av ; and whe. I into L

(1) Balro, I step, I go, fut Bhropes, perf. BiBnes. пот. Гват ; развично ін сотроннів, на пара-Ваїторан, раті. разв. паравівіция, пот разв. παριβάθην.

(3) čladou, I delte (a chariot), fut. člá, -åt, -å. inf ther, nor. fhare, perf. thinese; intel I drive from me, repel, nor handans, perl. pros / hhaum, mf. /Ankdefes, nor. pros. ħλάθης. (3) who, I drink, fut. whomas, nor. I were, superut.

wift, famili, inf. mfeir, part, wher, part, wewww. perf. pass. wéwepes, nor. ¿wóôns. (4) riva, I atour for, I pay for, fut. riva, not. frica, port. rivien, perf. pass rivious, inf rerioda, nor pass, irioday, mid. rivens,

111 τετισμα, ποι γιαντικού τετισμορ.
 12 σετισμο ματικό, πισομικό, ετισμορό.
 (3) φθάνω, Ι μα δεξανε, Ι αυτίστρατε, Ιπτ. φθήσωμα (more rurely φθάσω), ποτ. έφθάσω, and

(mucly in prosu) fossy and costings, perf. folia. Here belongs a verb whose pure stem ends in a

consonant :--Sannu, I lite, nor issner, fut. Sifepus, perf. net. δέδηχα; perf. pass. δέδηγμαι, nor pass. ἐδήχθην,

11. Verbs whose Pure Stem in the Present and Imperfect is strengthened by the introduction of the Syllable ve before the termination.

 βō-si-ω, I stop up. I fill up (construed with gen.), fut. βόσω, nor. iβόσω, perf. pass. Bifbroum, inf. Beftiades, nor. pass. iftioder.

(2) apur-re-opus, I arrive, fut, apleopus, 2 nor. άριεόμην, άφίκου, άφθεζοθαι, perf. άφιγμαι. inf. άφίχθαι, plup. άφίγμην, άφίζο, etc.

 (3) δπαχ-νί-ομα, Ι ρισμίες, ποτ. όπεσχ-όμην, Ιπηνετ. όπεσχεῦ; ἐπι. όπεσχήσομα, perf. όπίσχημα. So άμπισχνίσμα οτ άμπίχομα, I wear, I have on, Int. applican, nor. inwesxouns and hureaxouns.

VOCABULARY.

Asper, -a, -or, very high; 'indrior, -ou, ro, a garsummit Aurolpyes, -ev, 5, Lycur-'Azeriew, I atone for, juy m.

Mice, I get intoxicated. . for, panish. Fean enclitie, a strength-1 drink μέθυ (that is, ening particule, ip.e. it affirms what has wine not mixed with

water). Ofres, certainly not. gone before, and addsomething more, Holorekela, .ar. h. cost-Expaire. I per out. turn lines, splendaur. out -that is, prove or Zudorn, -ns, f, Bjurta. ZopBales, I go with, go

Extles, I drink out. I drink up. together; ovuBalies, 15 bappens. 'Ερικαύτω, i drive out. 'Ερικαύσμαι (with gen.). Zonwieg, I drink with. together.

Exencise 113.

I uttain to something. Translate into English :--

 Τοῦτ συρατιώταις ἐν τῷ συρατίς πολλά κακλ συνεβεβάκα.
 Σοφοῖς ὁμιλῶν καὶ αὐτὸς ἐκβιήση ropis. J. Aucespres manuration illinare vila Zrapres. 1. Hoddel omesteres and piperes offer. 5. O pebbur Bookles fore roo nenusiras. 6. Obc famiouss the obser. 7. Tobs savoippost of Beel drovicompage the other. A Tab's accessors of best descri-centre. N. Of matern tools materials topherase is a the mater opposites. It. O happin and more deliging. 10. Obtain of topherase and had a 11. Al yearhest shared years made had not no. 12. O aleas and the repartners of Endly. 13. O other ὑπίσχετό μοι άφίξεσθει.

Translate into Greek:--1. The woman put on brautiful garments. 3. The woman will pot on beautiful garments. 3. The friends promised to come. I The genoral got into the city before the enemy. 5, The gods GREEK. 171

punish c-il-doers. 8. Many friends were drinking together. 7. Friends drinking together become enemies. 8. Many c-ilis lappened to my children as they came (evaling) hither. 9. O that Apollo would punish that c-il-doer!

- 'III. Verbs whose Puro Stom is in the Present and Imperfect strengthened by the insertion of av (less often aw) before the terminations.
- (a) av or aw is introduced without any other change.
- All verbs of this kind form their tenses from a triple-stem-manely, the present and imperfect from the strengthened stem, the second norist from the pare stem, the future and perfect from a third stem which arises from the pure stem and an added s, which in the inflection passes into n. The a in the termination are is short.
 - aἰσθάνομαι, I feel, ποτ. ἠσθ-όμην, αἰσθέσθαι; perf. ἤσθημαι, fut. αἰσθήσομαι.
 Δμαρτάνω, I miss the mark, fail, sin, 2 nor.

 - 3. ἀπεχθάτομαι, I am hateful, nor. ἀπηχθύμην, inf. ἀπεχθάσθαι, fut. ἀπεχθήσομαι. perf. ἀπήχθημα. (I am hated).
 - aυξάνω (and αυξω), I increase, fut. αυξήσω, 1 nor. ηθέησα (perf. ηθέηκα), perf. pass. ηθέημαι, fut, pass. αυξήσομαι, nor. pass. ηθέηθην.
 - βλαστάνω. Ι εργουί, 2 αυτ. εβλαστων, fut. βλαστήσω, perf. εβλάστηκα and βεβλάστηκα.
 - 6. δαρθάνω, Commonly ns a compound καταδαρθάνω, I sleep, 2 nor. κατέδαρθον, fut. καταδαρθήσομαι. Derf. καταδεδάοθηκα.
 - δλισθάνω, I slip, I. slide, 2 nor. ωλισθον. fut. δλισθήσω, perf. ωλίσθηκα.
 - 8. δοφραίνομαι, Ι smell, 2 άοτ. &σφρόμην, fut. δοφρήσομαι.
 - δφλισκάνω, I am liable, I ρινε. 2 αυτ. Σφλον, fut. δφλήσω. perf. ἄφληκα, perf. mid. or pass. ἄφλημαι. Mark the double strengthening in συν αυτά.
 - (b) av is added, together with the insertion of the nasol v, before the characteristic consonant of the pure stem.
 - Thus in Assédes, pure stem sets, between a and d, s is intriduced, forming Assé, to which de is added, forming Assédes. The short vowel in the pure stem passes in the tenses (except the second aorist) into the corresponding long one: passédes is an exception. The s before a p-sound and a k-sound undergoes the usual changes.
 - θιγγάνω (pure stem θιγ-), I touch, 2 nor. ξθιγον, fut. θίζομαι.

- λαγχάνω, I obtain by lot. 2 nor. έλαχον, fat. λάξομαι, perf. είληχα, perf. mid. or pass. είληγμαι, nor. pass. ἐλήχθην.
- 12. λαμβάνω, I take, 2 nor. ἐλάβον, imperat. λάβε, fut. λήψομαι, porf. είληφα, perf. mid. or pass. είλημμαι, nor. mid. ἐλαβόμην, nor. pass. είλήφθην.
- λανθάνω, I lie concealed, 2 noτ. έλαθος, fut. λήσω, perf. λέληθα (I am concealed); mid. ἐπιλανθάνομαι, I forget, noτ. ἐπελαθόμην, fut. ἐπιλήσομαι, porf. ἐπιλέλησμαι.
- 14. πυνθάνομαι, I ask, inquire, learn, nor. έπυθόμην, perf. πέπυσμαι, πέπυσαι, etc., fut. πεύσομαι.
- μανθάνω, I learn, nor. εμάθου, fut. μαθήσομα, porf. μεμάθηκα. The a, contrary to the rule, remains short.
- 16 τυγχάτω, I hit the mark. I get, obtain (with gen.), it happens, 2 dor. ἔτῦχον, fut. τεύξομαι, perf. τετύχηκα (TTXE-).

VOCABULARY.

- 'Aγγελία, -as, ή, message. Εὐεργεσία, -as, ή, n benefit.
 'Aγε, 'come! come then! 'Εξαμαρτάνω, Ι fail, sin.
 (Imperative of έγω, Ι
 λαδι.

 (Here the εξ strengthmenting.)
- 'Aναστρέφω, I turn round 'Iδιος, α, -ον, one's own. (trans. and interns.). Κάμηλος, -ον, δ and ἡ, α 'Ανθεμον, τδ, bloom, camel.
- flower. το, οιοοπ, camer.

 flower. Καταδαρθάνω, I sleep, fall

 Βούλευμα, άτος, τι, π. nsleep.
- counsel determination. Λυγρός, -d, -όν, sad.
 Βραχύς, -εῖα, -ό, short. 'Οπίσω, behind.
- Γενταΐος, -α, -ον, of noble
 race, noble, brave.

 Δεθοο, hither.

 Γροσήκων, -ήκουσα, -ήκον
 (gen.-ήκοντος), seemly,
 suitable.
- Δοπέω, I think, I am of Πως (enclific), in some opinion, I seem. way.

 'Ελπομαι(poet of ἐλπί(ω), Συμφορά, -ᾶς, ἡ, an event
 - 1 hope (tλπfs). (especially misfortune).

 Έπαρκίω (with dat.), Ι Χεών, -ονός, ή, the earth.
 help. Χρόσιον (diminutive of
- 'Επιβούλη, ής, ή, a plot.
 'Επισρείω, I forswear myself, I swear falsely
 (with acc.).
 'Στορ τάχιστα, as
 quickly as possible, as

EXERCISE 117. Translate into English :---

 Καλόν μηθέν els φίλους άμαρτεῖν. 11. Μακάριος δοτι: έτυχε γενναίου φίλου.

EXERCISE 118.

Translate into Greek :---

1. The king is aware of the plot against him. 2. Who has not errod? 1. Whee me do not err (it is not af prise men to err) twice in the same thing. 4. The wicked man is hatcful to the pool. 6. Deing wicked, you will not be hidden at last. 6. My brethers having learn have wholen. 7. The pool will obtain good things. 8. The men felf noders, friends. 11. Horn to been vallectime. 12. He lay hid doing a wicked deed (that is, he did a wicked deed, and are not found and). 13. They hope to lie hid, being wicked (that is, he gar wicked also me the did not reicked, and he gar out to be diversed to the ricked, and he gan the he did not the different wicked, and he gan to the delicery not the different wicked, and he gan the he diesery and the different wicked, and he gan the he diesery had the different wicked, and he gan the he diesery had the different wicked, and he gan the he diesery had the different wicked, and he gan the different wicked, and he gan the different wicked in the different wicked in the different wicked.

IV. Verbs whose Pure Stem is in the Present and Imperfect strengthened by the addition of the two consonants an or the syllable was,

Ze are appended when the characteristic of the stem is a rowel, and see when it is a geomeonant. Most of the verbe whose pure stem ends in a rowed form the fature, etc., after the anniony of pure verbs, as epidence, fat, toppine (ZTPE). Some of the pure of the pure of the pure of the pure of the imported a required term of the respectation of the first consonant of the stem with the wavel i.

- δλ-Ισκ-ομαι (δ), T am Inken, captured (two) of a oity), imp, ἡλισκόμην (ΛΛΟ-); Ini, ἐλλοψος, 2 nor. ἡλεν and ἰδλεν, J ras tuken; port, ἡλεκα and ἰδλενα, I have been Inken. The active is formed by apper, to take, verveous.
 ἐρόπου, I please, fut. ἐρόπω, nor. ἤρεσω, port,
- mid. or μιςς. ήρεσμαι, αυτ. μαςς. ήρεσθην.
 3. γηράσκω (οτ γηράω), J grow ald, fut. γηράσομαι,
 1 αυτ. εγήρασα, inf. γηράσομ, μετε. γεγήρακα,
- 4. γιγνώσκω, I learn, I linon (ΓΝΟ-), fut. γιώσομω, 2 ποτ. έγνων (μι), perf. έγνωκα, perf. mid. or
- ρα-8. έγνωσμαι, αυτ. ρεικε έγνωσθην.
 5. διδράσκω, I run aray (only in compounds, as άποδ-, έκδ-, διαδ-), firt. δράσομαι, terf. δέδοδκα.
- 2 nor. έδράν (-μι).
 cóρίσκω, Ι ñind, 2 nor. εδρον, imper. εδρε (ETPE-), fut. εδρήσω, perf. εδρηκα; mid. J proente, nor. εδρόμην, perf. mid. or pass. εδρημα, nor. pass.
- ήβάσκω, I grow to maturity, fut. ήβήσω, 1 aor, ήβησα, perf. ήβηκα (ήβάω, I am young, but ἀνηβάω, I become young again, rejuvene-co).
- 8. θτήσκω, commonly ἀποθτήσκω, Ι die (ΘΑΝ-), 2 ποτ. ἀπέθανοτ, fut. ἀποθανοῦμαι, perf. τέθτηκα

- (not αποτέθνηκα), 3 fut. τεθνίξω, I shall be dead.
- θρώσκω, I spring, lcap, 2 nor. ἔθυρον, fut. θοροῦμαι, perf. τέθορα.
- 10. Ιλάσκομαι, Ι propiliate, fut. Ιλάσομαι, nor.
- μμυήσκω (with gen.), Ι τεπιευίδετ (ΜΝΑ-), ful. μιτήσω, 1 ποτ. βιστρα, perf. mid. μέμιτημα. (Lat. παιπίλη, suli, μάνωμα, -η, εγα, inper. μέμιτησα, plup. ἐκεμτήμαν, ομ. μεμιτήμαν, -βο, -βτο, οτ μεμιτήσω, τία, μιταθόσωμα, ποτ. ζιμιτήσωμα, ful. μιταθόσωμα.
- 12. πάσχω, formed from πάθσκω (Lat. patior), I suffer, 2 nor. έπάθον (ΠΕΝΘ-), fut. πείσομαι,
- ρυτί. πέπονθα. 13. ππίσκα. Ι drink, fut. πίσω. 1 αυτ. έπίσα. 14. ππράσκω, J κεli. perí. πέπρακα, piet. mid. or pars. πέπρακα, inf. πεπράσθαμ, nor. ἐπράθηκ.
- 3 fut. πεπράσομα.
 στερίσκω (and στερίω), J deprive, τυδ, fut. στερίσκω (a aor. ἐστέρησα; mld. and pass. στερίσκομαι, στερούμαι, fut. στερίσομαι, port.
- ζοτίρημαι, αυτ. έστερήθην. 16. πετρώσκω, Ι ενουπά, filt. τρώσω, 1 αυτ. έτρωσα, perf. mid. or pass. τέτρωμαι, αυτ. έτρωθην,
- Int. τρωθήσομα and τρώσομα.

 17. φάσκω, I am of opinion, I give an opinion, affirm
 (the indicative and imperative are very rare,
 the part's of φημί heing used instead), imperf.
- ἔφασκον, fut. φήσω.
 18. χάσκω, f open the mouth (XAN-), 2 not. ἔχἄνον, fut. χανοῦμαι, perf. κέχηνα, f stand apen.

Observe that διδάσκω, I teach, retains the k-sound in Int. διδάξω, 1 nor. δίδαξα, perf. διδίδαχα, nor. pass. δδιδάχθη,

VOCABULARY.

- "Adverse, -or, without 'E-earacless (Lat. refers), grief, griefless. I bring lack, refer to 'Aurquers's (with gen.), something.

 I have not in mind, Ecycrift, -st, well-born,
- I do not remember, noble.

 I forget. Μοῖρα. -as, ή, faie, lot.
 Δεκάs, -άδοs, ή, the number Μόρσιμος, -ον, determined
- ten, a decade, or period of ten years. Πέσχω εδ. Ι fare well, 'Εξευρίσκω, Ι find out, receive a favour. discover. Πεσθίω, Ι bewaii.

EXERCISE 119.

Translate into English :-

 'Ολήγους εφρήσεις ἄνδρας έταίρους πιστούς ἐν χαλεποῖς πράγμασις.
 Πίσην ἀνθρόποις μόρσιμόν ἐστιν ἀποθανεῖς.
 Μιθθούμετ τοὺς τεθνηκότας.
 - Ηδέως τὰν παλών» πράξεων μέμπηται οἱ ἄνθροποι.
 Οἰκ ἄν εθροις ἄνθρωπον πάντα ὀλβιώτατος.
 - "Η GREEK.. 73

καλώς (βρ. ή καλώς τεθτημεται, δ είγρυψε βούλεται. 7. Εί δεικό δε όμετερο κασόστες πεσιδύσες, μή τε δεού τούτεω μοϊρω έπαρφόρετα. Β. Εξ τει γημέσας (βρ. όξενται, δειός δοτε γαράσκευ πολλάς είς έτων δεκάδας.

EXERCISE 120.

Translate into Greek—

1. I have found me companion faithful in difficulties. 2. It is farted for these to die. 3. I hewatt my deceased father. 5. They will be mad the consect of the control of the control of the great mean of old (cracks). 6. I found no may over hoppy in all respects. 7. I wish to live honourably or to die honourably. 8. Through they

vory highly in all respects, 7. I wish to live honourably or to die honourably. 8. Through thy fellow thou wilt suffer much. 9. It is possible to discover many things, but not all. 10. Even the wise have not discovered a life devoid of grief. V. Ferbi volume Para Stem is strongthened by a radiuplication at the heplaning.

raduplication at the legiming.

This reduplication consists in the repetition of the first consonant of the stem in union with the connecting vowel. Only in a few verbs does the reduplication remain in the formation of the tenses.

To this class belong—

y'yvegus (instead of yryfregus), I become (FEN-),
nor. tyryfrey (FENS-), part. yryfregus, I have
become, or yfrew with a present meaning, as

I am (but reverts refers, time part), but.
respective (instead of reserve), I fall, imper. since
(IET-), but. recogner, 2 nor. freeze, perf.

Here also belong several of the fourth class, as γεγνώσκω.

VI. Verbs whose Pure Stem receives an e in the Present and Imperfect.

 γαιόν, Ι παιτη (used of the man), perf. γεγάρηκα; but fut. γαμό, 1 nor. έγηκα, mid. γαμούριαι, I am starried (of the woman—in Lat. πιθο), αοτ. έγηκα, μέρης perf. pnss. γεγάνημα.

γυμούραι, I am starried (of the woman—in Lat. nutbo) and Αγημάρια, perf. pass. γεγάμημας (Lat. in matrimonium ducor), and γυμμόθην, etc.

2 δοκίω, I appear (in Lat. videor), I think, fat. δίζω, 1 aor. δδίζω, perf. pass. δέδογμα (Lat.

visus sum), nor. pass. εδόχθην.
3. ξυρέω, Γ shear, out the hair, mid. ξόρομαι, nor.

εξυράμην, but perf. εξύρημαι.
 ωθέω, Τ push, imperf. εξύουν, fut. δσω and δυήσω, 1 nor. έωσα and δση, perf. έωσα, mid.

fut. Groups, nor. desdans, perf. serges, nor. pass. 1608yr.

VII. Vorbs which in the Present and Imperfect have.

VII. Verbs which in the Present and Imperfect have the Pure Stem, but in the other Tenses have a Stem with ε as the Characteristic. (The ε passes into η; except axθομαι από μάχομαι.) 1. αλέει, I κατά off, fut. αλεξήσω (the active is

 adder, I rave off, tot adding the active is unusual in proce), mid. I reard of from myself, I defend myself, I punish, but adding open, act holdany (from Anth).
 axis open, act is access, but axis open, nor.

ηχθέσθην, fut. pass. αχθεσθήσομαι, of the same import as αχθέσομαι.
3. βόσκω, I feed, ματάπο (intrans.), fut. βοσκήσω, 1 nor. εβόσκηση; mid. with pass, aor. (εβοσκήσω).

δυέλ, I feed.
 δυόλομα, I am willing, fat. Βουλήσυμα, perf. Βεβολημα, soc. έβουλήσυμ and ήβουλήσυμ.
 δύο, I leek, mant (commonly as the impers. δτ. there is an exessity), subj.

δόρ, part. δόο, int. δόο; impert. δόο, opt. δόο, the Seders, 1 aor. δόομας, part. δοδέρες, mid. δόρμα, 1 πουά, fur. δοδόρες, part. δοδέρες, mid. δόρμα, 1 πουά, fur. δοδόρμα, opt. δοδόμα. 6. δόλω and δόλω, I am willing, with, impert. βόλων and δόλω, I am δόλων and δόλων. 1 apr. δόλων and δόλων.

φόλληκα.

1. cha, f. press, I drice, enclose, fut, sh.ήσω, part. mild. or pass. εθλημα, αυτ. pass. ελλήθης.

8. ΤΡΟΜΑΤ, f. ask, αυτ. γληθης. Γ asked, sub.].

1 μεμαι. opt. φορίμον, imper. φορί, φόρθας, με μεριαι. opt. φορίμον, imper. φορί, φόρθας, με μέρμος τιτι φόρθας τι the other tenses are supplied by φορτών.

2. βρου. I φο βστελ, fut. λρηθαν. 1 αυτ. βρομσα.

porf. ήρρηκα. 10. e35ω (commonly καθείδω), I eleop, fut. καθευδήσω, 1 uor. ἐκοθεόδησα, porf. wanting. 11. έχω, I hase, hold, imporf. είχων, 2 nor. ἔσχων,

from J. Annes, Andel, Impart. «Eyen», 2 nor. forgen, int. open, imper. pcgts, represent (ra), hubj. sept., pc, none for pcg., pc, none for pcg., pc, none for pcg., pc, none for pcg., pc

inthon, perf. mid. or pass, tipupas.
h. medica, I. acet. I. zeet. vayed, imperf.
éedinfor, old Attic redifique, fut. resultina; mid.
I. each myant, I. zei. Jan. resultina; mid.
I. each myant, I. zei. Jan. resultina; mid.
i. each myant, I. zei. Jan. resultina; mid.
resultingur, I. zeitzel myant, I. zei. down; beabelgimonthlypus, I. zeet myant, I. zei, impert. beabelgieenington.

 μάχομαι, I fight, contend, fut. μαχούμαι (instead of μαχέσομαι), nor. ἐμαχεσάμην, perf. μεμάχημαι.

pap, fut. pubedelina.

- μέλλω, I think to, I am about to, I loiter; imperf. ξμελλον and ήμελλον, fut. μελλήσω, 1 aor. Ιμέλλησα.
- 17. μόζω, I suck, fut. μυζήσω, etc.
- h(ω, I sweel, int. hugges, etc.
 h(ω, I sweel, int. ô(from, 1 aor. ω(from, perf. 58ωδα (in Homer and the later writers) with a present signification.
- 19. οίομαι and οίμα, I thinh, 2 pers. οίει, imperf. φόμην and φίμην, fut. οίήσομα, αοτ. ψήθην, φίμθηναι, perf. wanting.
- 20. οίχομα, I am ont (Latt abit), imperf. φχόμην, I came forth, int. οίχήσομαι, I shall go forth, aor. wanting; perf. φχήμαι, I have come forth (commonly only in combination, as παρφ-χημαι).
- 21. doelhu, I am liable, I one, I must (Lat. debeo), fut. doelhuu, 1 aor. upelluna, port. upelluna; 2 aor. upelluna, es, e (1 and 2 plur. not in use) with the infinitive in expressions of a wish (Lat. utinam).
- πέτομαι, I fly, fut. πτήσομαι, αυτ. ἐπτόμην, πτέσθαι (not so often ἐπτόμην, -μι), perf. πεπότημαι.
- πεπότημαι. 23. χαίρω, Ι τεjoice, fut. χαιρήσω, αοτ. ἐχᾶρην (-μι), perf. κεχάρηκα.

With these verbs may be classed several liquid verbs, which, however, form the future and the norist regularly: for example, \$\mu for 1, \text{ remain}\$, perf. \$\mu \text{ \text{prime}}\$, which perf. \$\mu \text{ remain}\$, perf. \$\mu \text{ \text{ remain}}\$, \$\mu \text{ remain}\$, \$\mu \te

EXERCISE 121.

Translate into English:-

1. O. repairer with enhanten höckereren. 9. Mit görferige der fragerberer Dergrässen. 5. O. maje eine het gering frager flowerige der Grennen der G

EXERCISE 122.

Translate into Greek :-

1. The booty was divided. 2. I will divide the frem an arrow at the singe of Methone. 3. The fruit of wisdom

body. 3. The city will punish the ensemy. 4. My son, do not be vexed when reproved for thy sins. 5. Good hoys are not vexed when reproved for their sins. 6. I will make an expedition against Athens. 7. They small of perturn. 8. The soul will fly up to heaven. 9. Good men rejoice at good. 10. Our soldiers have need of provisions (necessaries). 11. A good man will care for his children, and cood children will care for his children, and cood children will care for the children.

KEY TO EXERCISES.

Ex. 18.—1. Do set dig up the grave of one who has been legend, 2. Tennist of the mind midsed own a serie man. S. Thristitacles the Alberian was silustinerited the list father on account of the inside of his youth. A God in a surraged crey, thing for the best in nature. A step you have well his, shrick out you have have been controlled to the product of the well with the waste of the product of

Εχ. 103.—1. ΟΙ βάρβοροι όπι των "Ελλήνων εξωίχδησαν. 2. ΟΙ βάρβος είν την πόλιν έφιγον. 8. ΟΙ πελίμιοι τήν εύλιν κατέρλεξου. Α. Σύ πολόμου όρωντίζην. 6. Υίματο προγμάντω φρεντίζετε. Ο. Πολέμου καὶ πραγμάτων φροντίζων παράττει. Τ. Πολλά καλά έργα όπο των Ελλήνων επράχθη. 8. Αι γυναίκες καταπλαγείσει όπο του ποικριών έρκεγον.

Ex. 10r.—1. Pree ms, my friend, from my tolls, seather my cares, and turn me againt to followines: 2. Mithridales has plundered Asis. 2. Thinks before acting. 4. The gods bestowed happiness on sea. 3. God has field all things tegether. 6. Droco's laws one penalthiness had them had down for all thingsgress—death. 8. Speak not englogist on theyeld. 76. The youths among the Greeks were scenationed to bear hanger and thirst and cold, and in addition thouse and other hardand thirst and cold, and in addition thouse and other hard-

Ex. 108.—1. Méquivai orelàficorai. 2. Méquivai orelàsobje orarea. 3. Ochor inn inn bia bia horsis d'antéreai. 4. deplani pular Gular, hétarra, hárdaus algenirais hiperos. 5. Toris Adopalars di hayadayar. 6. Ol Adopaics dei relavguarpieto icini. 7. Ol Elderge voir leghton estrar selvous épices iliques. 3. Laugharg vir employ d'écupiado. 6. H gibi minus harrépai perfante l'endacra.

Ex. 100.—1. It's not easy to judge friends. 2. Wealth has done midsel daw who lanesquireful it has different habit of life.

3. The measureful recognition was of the victory. 4. The recognition recognition arranged the construct, 5. Dry's shipmarched men, store a voyage is uncertain. 6. If you kill your for you will point by your hands. 7. I shall not the fields, but God will give the factors when the fields are considered as the first point of the fields of the first point of the fi

Ex., 110,—1. Οι πείδες τὰτ χειρας μιαίτουσαν. 2. Ου δύτατός, ευτι φίλους ερίνει. 3. Πολλεί τότι της ἀκλικοχίας διεφθαρμένοι ευίν. 4. Η Γεκή υπό τῶν ἀγελικο ἐπηγέλομ. Ο οἰ χράσία τοὺς πέσηται οἰκτεροῦσαν. 6. Τὰ τῆς σῆς ἐμπαιρίας πολλά ἐκξοδευμε. Τ. Φίλου ψίλου τὰ χροντά οἰκ ἐκξοισοῦσαν. 3. Οὶ πολίται τῶν χνέρο συτέροραντ.

Ex. 111.—1. The soldiers were encouraged for the fight by the general. 2. Philip lost his sight by a wound in the eye

- shall sever be destroyed. 4. I should be ablaused if I appeared to flink more of my own glory than the common sately, 6. Mile, the athlete of Croton, took up a bull, and carried is through the much of the race-course. 6. News but here appeared through the city that the enemy were compared. 7. The citres will be a ranged on the enemy for the defeat.

Es. 112.—1. O appartyde wide appariment eie fin palgywpacificer. 2. Os appartyde wide appariment ampolymoirus. 3. Os molitas wide reducione rejle vie firme faufowerus. 4. El apparimentatione final partyde faufowerus. 4. El fin farwidgier. 4. Os apparimentation faufowerus. 4. El fin farwidgier. 6. Os apparimentation faufowerus. 4. El fin farwidgier. 6. Os apparimentation molitar faufowerus. 7. Thysikir apparimentation faufowerus. 4. The faufowerus. 8. This of the faufowerus faufowerus. 4. This of the faufowerus. 8. This observation of the faufowerus. 4. This observation of the faufowerus.

THE ORGANS OF SENSE.—IX.

[Continued from p. 113] V.-THE ORGAN OF TOUCH.

THE sense and organ of touch have been placed last in the list, because we have been all along proceeding from the more special to the more general sensations. The retina of the eye is specially modified and set apart to receive and interpret the light. Light has neither meaning nor effect when applied to other parts of the body : and the retina is out of the reach of other kinds of contact, and is quite insensible even to great heat, as Professor Tyndall has shown experimentally. The car appreciates the aërial waves which are othorwise unknown. The nose and mouth, though they are less exclusively devoted to smell and taste, and not so specially modified to receive these impressions as are the foregoing organs, yet have special sensations. The sense of touch is more akin to what may be called common sensation, or general consciousness, and the organ is more widely extended and more intimately connected with other functions than the organs of the other sensations. If the eyes were closed, and no objects presented to the senses of hearing, taste, or smell; and if, further, the body could be floated in a liquid of such temperature and consistence as to present to the mind no sensation of contact, there would still doubtless be a general consciousness of the existence of the body, not only as an intellectual deduction but as a sensation. This sensation forms an indissoluble link between mind and body. When all goes well there is a feeling of pleasurable existence, which may be called general and massive, rather than special or intense. When any part is disordered, a general feeling of depression cannot be shaken off. The sense of touch is allied to this general consciousness, but it differs from it in that . ils impressions are distinctly referred to the parts from which they proceed—the mind is able to localise them with precision. With regard to the

locality of the impressions which proceed from the viscera, we know but little except by reason. Hence ignorant people will refer maladies very wrongly. Thus we hear of hearthan and stitch in the side, Nervous people will attribute rheumatic muscular pain to the lungs, stomach-complaints to the heart, and lumbago to the kidneys. This wrong reference is made even when the pain or inconvenience is occasioned by a mechanical cause, as by distension , or pressure; but directly the cause of these obnoxious sensations reaches the skin, we can at onco fix on the locality. Thus we learn that the sense of touch is distributed over the surface of the skin, and to those extensions of it which proceed from it to line the interior of the passages leading from the exterior of the body. The organ and sense of touch does not go far as we proceed into the interior of the body by these passages. Thus the throat is only sensitive to touch at its top part. The sensation of heat and cold-proceeds further down towards the stomael, and below this all localised, taetile sensation ceases.

In describing the organ of touch we must therefore explain the nature of the integrment and its appendages, although in so doing we are aware that this integrment has many other functions, and is intimately blended with other structures which, have nothing to do with the sense, but which we are compelled to notice.

The skin consists of two inverse. The outer one is

called the enticle or issurf-skin (epidermis), and the deeper layer the entits vera or dermis. The enticle has neither blood-vessels nor nerves, but consists of cells which are formed at its inner surface (where it lies on the exitis or true skin), and are pushed outward as fresh status are successively formed below them. When first formed, these cells are filled with figl4; they are oval, and longer in the direction perpandicular to the surface in the direction perpandicular to the surface in the direction in the containty direction, so that are fattered in the containty direction, so that are are 'shredded off and stripped away in scaly or surfy fragments by the ordinary wear and tear to which the outer surface is subjected.

The office of this part of the skin is simply proctive; and in relation to this office of clothing and defending the blood-bearing skin, it is found thickest where there is the greatest friction, and thinnest where there is least. It is, however, thin excryaterly, arying, from it, of an inch in the pain of the hand to why of an inch in the scanned of the hand to why of an inch in the same of the hand to while the same in the same of the hand to while the same in the same of the hand to while the same in t

employments make the wear and tear excessive, unwearied nature still supplies the demand, and an excessive manufacture of fresh cells is stimulated from below. Thus, in the polishing of japanned articles it is found that no other fabric but the human euticle is sufficiently delicate to produce the shining surface. The finest wash-leather would seratch; and hence women are employed to scour /trays, etc., all day long; and yet they never wear down to the true skin so as to make the fingers sore, except during the first few weeks. The provision for the repair of this closely fitting vestment is even carried beyond this, for if the whole-cuticle be stripped off, so as to leave the entis naked and sore, there is an immediate outpouring of fluid from the blood, which soon forms a scarf-skin,

As this scarf-skin has no blood-vessels running into its substance, it has no means of self-repair; so that in proceeding from the deeper layers to the surface, the cells go through all the processes of birth, doath, decay, and dissolution, though the · membrane is so thin. Since, also, this skin has no nerves entering it, it has no sensation, and the sensation of touch must be felt through it in the same way -though in a much more perfect manner-as we feel anything which touches us through our clothing. It will be seen, then, that it must fit very accurately and closely to the sensitive skin beneath, or the sense would be dull and imperfect. below has an immense number of small hillocks, and each one of these is closely surrounded by, and enclosed in, the inner layer of the cuticle which is monlded upon them. When the cuticle is stripped off after being long soaked in water, it shows an infinite number of small pits, out of which the hillocks or papillæ have been dragged. If the whole be torn away before maceration, i.c., from the living skin, it usually tears away the papillar with it, leaving a bleeding surface.

In providing at once for the protection of the cutis, and also for the preservation of the acuteness of the sensation of touch, there is this difficulty: those parts which are most used to gain information by touch are necessarily those which are most subject to friction. In such situations, then, the cutiele must be thick; yet a solid thick sheet would be liable to make us confound impressions made by two points near together which were in contact with the skin. There is a beautiful arrangement to obviate this difficulty, which is found in the enticle of the tips of the fingers, palm of the hand, etc. Here the surface of the skin is seen to be thrown into small ridges and furrows, which run in curved lines parallel to one another, so that an impression made on the surface. or tops of the ridges, is only conveyed down to the

profile immediately beneath it and does not pressiderary on those of the other 'ridge. A more minute constitution of the tip of the fager with a lens will above that these way ridges are sabdivided fitties quare-shaped masses by cross furrows, which occur at regular intervals, so as to leave the thickened part between of the same-width as the ridge. Each none of the square-shaped masses has in its centre a little pit, which is the opnoing of a sweat-gland. No such definite arrangement of ridge and furrow occurs in other pairs of the body, or rubor, not divery distinguishing the rest pairs of the or rubor. The profit ridgit is the property of the pairs of the body, or rubor, not divery distinguishing the rest pairs of the body.

The cutis, or blood vascular skin, is tough and elastic, and consists in its deeper layers of interlaced fibres which hold in their interspaces little . masses of fat, sweat-glands, oil-glands, and hairhalbs, with hairs proceeding from these last which rise above the surface. It is also permeated with. nerves, arteries, and veins. This, therefore, is a structure having all the endowments of life, and with the faculty of self-sustenance and sensitiveness. The true sent of the sense of touch is, however, its external portion, that which lies immediately under the cuticle. Towards the surface the fibres become closer and denser, and the various glands and fatty masses cease, while the blood-vessels and nerves are more numerous. In order to increase the touching surface, and to hring the nerve-threads closer to the exterior, the outer surface of the true skin is, as we have seen. raised at intervals into papilles. . Each of these is well supplied with vessels and nerves. Under the ridged surface of the palmar side of the hand, these papille run in lines corresponding to the ridges, there heing two rows to each ridge, and sometimes smaller ones between. In other parts they are scattered irregularly, and are much fewer in number. That these papilles are the true scats of the sense of touch appears not only from the fact that nerves are traced into them, but because there is a strict relation between their number in a given space and the delicacy of the sense of touch in those parts. Thus in the space of one square line (114 of a square inch) there are 108 on the tip. of the finger, 40 on the second joint, and only 15 on the last; and this decrease in number is in direct proportion to the sensitiveness of the surface to touch. Where the sense of touch is most acute and discriminating little oval shaped bodies have been found, one lying in the centre of each papilla. and these have been called the "little bodies of . tonch." It must not be supposed, however, that each of these papille is capable of transmitting a separate impression to the brain, or that their office is simply tactile. Nerves do not enter all of them,

and they are concerned in secreting the substance to form the cuties. It would seem as though each nerve which conceys a single distinct impression to the mind bad-a certain definite space of surface

were fest; and then measured the distance on a scale of inches and lines. He thus arrived at very definite and very interesting results. Among many other measurements of the least distances at which

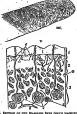


Fig. 13.—I. SECTION OF THE HARMLESS SKIN (SECTI MAGNIFIED). II. SECTION OF THE HARM SKIN (SECTI MAGNIFIED).

III. TOP OF THE FOREFINGES.

of sitis, over which its final branches spend times when it is solved as the sit is to which a two wholes a total the low shint at two which as the site of the si

two points could be distinctly felt, we quote the following:- to. hers.

The reader may varify these estimates for himself, but it is better to try them on some other persent, but it is better to try them on some other persent, because the impressions produced upon the eye and the mind by the alght and knowledge of the open compasses have a tendency to bins the information received from the sense allows. But it is a sense allows the sense allows but it is a sense information but it is a sense information. But it is a sense information of the sense in the sense

given. From these statistics it will be seen that the tip of the tongue is the most discriminating part of the whole body. An easy verification of this will occur to everyone when they remember how small a flow in the teeth the tongue can detect-a flaw which is quite unnoticed by the tip of the finger, if that be applied to it. At first thought, it may seem strange that such acuteness of touch should be bestowed on an organ which is rarely used to gain tactile information, and so placed as to be difficult of application to external objects; but when we consider how needful it is that the tongue should be able to feel every particle of food, so that we may know whether it is hurd or soft, large or small, and be able to place it accurately between the teeth if it be not soft enough or too small, we cease to think the arrangement strange. The tongue, too, works in the dark with very little assistance from other senses, and so must be always on the alert.

Next to the tongue come the tips of the fingers

and thumb. These are the salient points of that wonderful piece of mechanism, the hand. The hand of man is pre-eminently the tactile organ, and the free sweep of the arm, which enables it to turn in overy direction, and to be applied to every part of the person, is an admirable accessory to its sente sense of touch. The lips are but little inferior to the fingers in acuteness of touch. A story is told of a blind girl, whose employment caused a thickoning of the cuticle of her fingers to such an extent as to create a difficulty in reading her New Tostament in raised letters for the blind. She at first tried the unfortunate expedient of paring the skiu of her fingers, which made them more acuto for a short period, but in the end, of course, duller, so that she could no longer read the loved volume. With a sentiment of griof and despair she stooped to give the sacred text a farewell kiss, and so discovered a new mode of studying it. Though, doubtless, this has become quite n pintform story, it has in it so much physiological truth that there need be no hositation in repenting it. Referring ngain to the probable theory that there is a separate area to each nerve-unit, it will be seen that that area occupies a space of six or seven square inches on the middle of the back or thigh, and only one square line on the tip of the finger. The former measurement is approximately 1,000 times as large as the latter. It is eurious how nicely the discriminating sense of touch is adjusted to those parts where it is most likely to be of service. Thus, since the angles of the body are more likely to come in contact with other bodies than its depressions or the middle parts of its serments, we find the skin over the junction of

two long bones more able to distriminate than that 'over their middle portions. The convexients of the joints are usually more distriminating than the contextities; the shoulder more than the arm-jul, and the elbow than the inside of its joint. Yet when we arrive at the hand the reverse ig the ease, for the palmar surface is more distriminating than the back part. This is for the obvious reason that we usually avoid knocking our knuckies against anything, while og graps is so natural to the hand that it is quite an instinctive action, as every infant manifests.

SPANISH .- XI.

NUMERALS (continued).

THE cardinal numbers for elevan kundred, tractive kundred, the thousand, three thousand, etc., are mily circute, mily docientes, also mil, tree mil; the kundred thousand, etc., have mil, dociente mil; for a million, two millions, etc., element, decines mil; for a million, two millions, etc., who millen, doe milliones. Millen is not nu adjoctive, but a noun.

The is declinable, changing the final v into a whonever it refers to a feminine noun. All of the environment in the interest or in their feminine in as; as, declents mugeres, two hundred nones. The rest are indeclinable.

All the ordinal numbers clange the last o into a to form their feminine.

Une drops the last letter when it comes before a

Cente drops its last syllable when it comes immediately before a noun, but not when any other word comes between it and the noun: thus, elen soldades, a hundred soldiers; and ciento y tres soldades, a hundred and three soldiers.

Primere and tereere, among the ordinals, drop

The cardinal numbers (and not the ordinal) are generally need in Spanish to express order or rank, when the number exceeds nine; when under nine, the ordinals are employed; thus:—

Enrique Oclavo, Henry Eighth (the Kighth), Carlon Doce, Cherles Tortle (the Tortleth). Tortle (the Tortleth).

In mentioning the days of the month, the Spanish use the cardinal adjectives and not the ordinal, as in English, except in the first day, in which primere and not an is used; thus:—

El primero de Euero, the first el tres de Marzo, the first ef dannery.

El den de Febrero, the tres (const) of Febreary.

El dex y seiv de Mayo, the siztem (victorath) of May.

In dates where figures are used, the article is

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Konsters not amon, for fore to no quero alaberme, I wish sourcefor (or each other).

The profits a penus assets.

The profits are is also frequently used with the vorb in the active roice, of the third person singular

or plural, to express the passive voice, as in this example:—

La case so queeze,

The house was berned (the bouse berne steel).

The first objective case of old the personal promuss is sometimes used with a reflective verb in a

passivo sonso; ne—

Yo me minito, I on surprisal Vasotros os alegrais, pay ore reported (pour repose pouredech selects).

the sense of they, as so died, they say, that is, people say; so plens, they think.

So and other prenouns of the first objective case are often used in Spanish with neuter and notive Instrustitive order reductively, and in such cases

Intransitive verbs reflectively, and in such onces seem redundent in English; nu— De alli so pasé a la cludut, Yo me surquente, ? regest throw he pursed (hissed!) to (constitute, he repeats (himder city.

as easy.

So is comparation, as repeat quantities.

So is sometimes used in the service of the kin, to her, to then, to you (i.e., to your secretary). This use of set takes place only when another personal present of the objective case and of the bird person im-

of the objective case and of the third person immediately follows it; as--Trego ma cochara; se is I here o spon; I will give it to dark, also

When, in eases coming under the above rule, the presons as does not denote with clearness the numher or gender of the none for which is employed, the second objective is also used; as—

So la dure à ella, à ellos, à V., So la mandó der à ellos, he fuelt gree it ée her, to these, consumeréel it to be given to these.

The first objective case of the Spanish personal promous is very often to be rendered in Ragifial by the perposition to and the pronount is ver, to kim, the part, to kim, to kee, to then, etc. and it is time equivalent to the second objective, at it, it was very set of the second objective, at it, it was very set of the second objective, at it is the proposition than to is used in rendering the first objective into English; are

* We cannot day, to be dard, I will give it to have, but so be

omitted, oud except the first day of the month, the cardinal numbers are nicel; as—
Mostrik IV do disto de 1810,
Paus, 4 de Julio de 1814,
Lidaries, 2 fo d kyant de 1814,
Lidaries, 2 fo d kyant de 1814,
Lidaries, 2 fo d kyant de 1814,

Poss, 2 de Julio de 1814. Lengus, 4 de Julio 1845. Lengus, 27 de Agosto de 1847. Lengus, 4 spec 1846, 1847.

The hour of the day is expressed by the ordinal numbers preceded by the definite article, which

The hour of the day is expressed by the ordinal numbers preceded by the definite article, which must in such a case agree with home, kenre, understood (unless the hour be one, when it agrees with

the singular, hores); thus:

LQue home or what o'check is Son has tree sections after minuscon, if is few elimites helper

Res man, it is new elock.

Son has don, if is two elock.

Son has don, if is two elock.

Son has don, if is two.

In speaking of the age of persons or things, the verb streer is employed in Spanish ; as—

It is also Tournay to time of Callet time decretos, Carrier street of the Mills of the Mills of the Carrier street of the Mills of the

In Spanish it is not said, in expressing measurement, "twenty foet high," or "ten feet long," but "twenty feet of height," "ten feet of length"; as— Lo casa tenia acquita codes. The house was then) neity celeir de largo, y vertice codes de long, and ferezy celeir wide, archie, y treats accode de and ferre y celeir wide, archie, y treats accode de

oltura, THE PRONOUNS.

The personal pronouns of the nominative case, when used, may come either before or after the verb, except the latter be in the Imperativa mood, or the sentence be interrogative, in which case the nominative generally follows the verb, as vive clie, say

tive generally follows the verb, as viva clin, may be lize; it in habitade of 1 has be appears.

As the vorb-ending generally indicates of itself the person and number that its nominative must be, the nominative personal pronouns are seldom coppressed in Spanish, nuless when necessary to distinguish the persons or genders, or to be emphasic, or whom a relative pronoun it to follow;

th que tiena dinera, tiene anidistos, ke sele kus assury kus y no viocetros, ev sistif be arres. El y ella son prudentes, he and de ara rendent.

The first objective case of all the personal pronouns is also employed with reflective or reciprocal

verbs; as-

Juan me dijo, John said to me. Se lo agradezco, I thank him for it.

To le pido, I ask at of thee (or, from thee).

To ut thee).

The second objective with the preposition-4 is not used, except when the same verb governs two or more pronouns in the objective case, or when it is designed to be distinct or particularly emphatic;

Juan viva, dijeron ellos á ella, Jann ilió dinero á él, à ella, j John lires, sold lies do ker. Vo vi á vosotras y á ellos, I ano you and then.

To add more cleamess or strength to a sentence, both objective cases of promonars are often employed; the second objective case then being placed either before the first objective or less after the verb except the first objective case comes after the verb (as in the case of infinitives, gerunds, and imperatives), when the second objective must come after the first; as—

À mi me dijerou, or me dijeron à mi, they told we.

Desirine à mi, to tell me.

Dime à mi, toll me.

When the sentence may contain a noun in the objective case governed by the preposition d, a pronoun of the second objective case is often used in Spanish, and is not to be translated in English; as—

A Dios nadie le vió jamas, God no man sam (him) erer; Le., no one erer sam God.

Misme, meaning same or self, is often used with the nominative personal pronouns: thus, yo misme, I myself; nesotros mismes, we envestere, etc.; and also with the second objective; and must always agree in gender and number with the noun to which the pronoun refers; as—

4 Qué dice de ti messao? what La mager hablara por se missayest thou of thyself?

La mager hablara por se missayest thou of thyself?

Mismo is often used with nouns also; as, la misma Maria, Mary herself; los mismos soldados, the very

soldiers or the sublicrs themselves.

When by the pronoun it is meant anything to which we cannot apply a gender, elle is used. It is first objective fo is employed by the game rule. Thus, if it be suid, "he has been told to love list enemies, and he does if," the pronoun it refers to the clause of the sentence, "to love is enemies, the form of the sentence," to form of the sentence, "to form of the sente

Lo is used in Spanish for so in English, when the latter can be replaced by it: as—

V. piensa que ella es ruea, pero Si lo es, if il be so, no lo es, pou think that she is Diego lo luce, Junes does so, ruch, but ale is not so.

Lo is often used for lo when the latter refers to a masculine noun, and is immediately governed by a

verb (though this use of lo is not grammatically correct); as—

Espero que lo véo en perfecta I hope that I see him in perfect salud,

The demonstrative propount sets and cause

The demonstrative pronouns este and aquel are often used without any nonn, and in such a case they have the sense of this one and that one, or the one: as—.

Este es aquel de quien yo dije, This one is the one of whom I said; or, this to be of whom I said.

Todo aquel que is used in the sense of creryone scho; as-

Todo aquel que bebe de esta Errryme sobo drinks of this agun,

Quien often means he who, she who, one who; and quienes is used for they who; as—
Quien calla clorgs, he who is Perque los eneriala, como silent, cousculs.

Maria fue quen lo dijo, Mary was she sho suid if.

man there is a one who has anaborita.

Such expressions as it is I, it is thou, it is he, it is she, it is ne, etc., are rendered in Spanish by I am, thou art, he is, she is, we are, etc., as-

Yo say, it is I. Ellos son, it is they. Ella es, it is she. 2 Es V:? is it you?

THE VERB.

AGRUEMENT OF THE VERB WITH ITS SUBJECT.

The verb agrees in number and in person with its subject or nominative, expressed or understood;

Soy general, I are a general.

Elia anna la verdad, she lores

neans, the Americanos aman las rineans, the Americans tore
riches.

When a verb has two or more subjects, each in the singular, it is put in the plural; as— If noder yiel medium, "Feliro Diego veniran," Feliro my fuller and my secher lore or James will cove.

When a verb has two or more subjects of different persons, it is put in the plural, and agrees with the first person in preference to the other two: as—

Mi heranno y yo esiamos malos, my trother and I (i.e., and I (i.e., are) are well, we') are ill.

If the second person should be used with the third, without any first person, the verb must be in the second person plural:—

Thy ella estats buenas, Thou and she (i.e., you) are well.

When a relative pronoun is the subject of the

verb, the latter must agree in person and number.

This is different, as will be perceived, from the role in English arnta, which requires to a singular nouns connected by a disjunctive conjunction to have the verb agree with them in the singular form.

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with the sean or process to which the relative the gerund without the proposition, or the infinitive mood preceded by the proposition con; asrelates : esfacetive debetos so becom ag. Our debtes are rendered agree redubtes rungidededaton; av. able by perforating them. Runstron debetos so bacta, accedables our campillion. Yo say due kutho contigo, if is . Vosetros que soin sático, pr I sobo spenk setth thee, trip are wise. A collective near taken in a general sense, that is, a nour representing the whole of the persons or things mentioned, requires the verh to be of the Instead of the gerund of the past, the gerund of the present is semetimes employed, preceded by the singulor number; aspreposition as ; as-El cifereite de los Coldicos per-alguno al rey, egoi tic king.

A subject which is a collective noun, taken in a partitive sense, that is, representing a part of the whele of the collective news, and conveying plumlity of idea, requires the verb to be in the plural; as-Parte croise to que les decis, Part believed what he teht them, y parte no lo creisn, and part believed it set. This last rule is not always followed, even by the

This has true is not means consensus.

In cates in which a verb oppears to have two subjects, it most agree with that noun to which it seems more particularly to belong; as— Les gages del peciodo son The seaper of six are (10) denth. USE OF THE MOODS AND TENSES OF VERBL

THE INFINITIVE, GERUND, AND PARTICIPLE. The present teese of the infinitive expresses affirmation in an indefinite manner, without reference to number or person, os decir, to say; dar, The infinitive is used in Spanish when in English the present participle, preceded by a preposition, is used; as-

En darmmer torrentes de san-gre, in spilling (to spill) disting (to dine), i.e., from torrente of blood, The infinitive is frequently used os a verbal noun present participle, by placing the masculine fields article before it; as in these examples :— Al case del dis, si fac fall (at El murmurar de les frences file to fall) of the dry.

El lever uso guants, resolling (the fac reaty places set.

The infinitive is often rendered in English by the present participle, when in Spanish it is governed by unother verb; as— La citada caritar, sec heent her Le vicarrer, I sew him ron, or singing (to sing), rauning (to ran).

In Spanish, the gerand is employed in the sense of the present participle in English; as-Queriento seguir disponsiondo.

Les prisinto di poles fimilies,

les planto di poles fimilies,

les perisint dena acc.

Le prisint dena acc.

Le prisint dena acc.

Le prisint dena acc.

Le prisint de la planto est de la planto

In sentences such as Charity is increased by cultivating it, it is allowed in Spanish to use either

En nyundo cato, salto para On keering thus, he set out for Beston; or, Hebrescho bido Dorin; kering heard falls, teto, milió para Bioton.

The gerued in Spanish is after employed in a onner that requires the adverb solile to be used in translating it into Roglish; as-; El que viva en deleites, ravoir.

de ceta muerto,

l'a min tires in plenures, solile
l'alies és desil.

The past participle is iedeclicable when used to form the compound tenses with the auxiliory verb haber; as-Los mageros bon hablado, the Elin ha hablado, ele has quites, somes hare spekes. When the past participle is used with any other

verb thon Asser, it is declinable; as Verro saron antidor, 10 is doctimatodo 2 al—
like ha sido adoctiva, ale har Elle van antidoplana. Any go
leon desprieze.

John antidoplana desprieze.

John signa es hallous moderatodors,
moderator.

John signa es hallous moderatodors,
moderator.

John signa es hallous moderatodors,
moderator.

John signa es hallous moderatodors,
moderator establica de la laboratoria del la laboratoria de la laboratoria de la laboratoria del labo

The two last examples, it will be perceived, require the participle to agree with the noun governed (cortas). Ther and Henry are, as above, sometimes ed as a kind of auxiliary verbs, and oan always he rendered by Asre; thus each of these exemp miny be tennslated, he has written three letters. The past participle is in Spanish used with a new r pronoun in the case obsolute: thus, hallade

means found, and absolutely, being found; cautado means sent, and absolutely, being sent; recibido means received and bring resoired. In general, the participle is placed before the nous of the case obsolote, with which it agrees (though the rules of Spanish construction admit of its being ploud after the nom); nsoussle Vest-Cruz, et General Peru Cruz being inien, General Bootl sellé ness Jahan, Suct set out per Julyan.

TREES OF THE INDICATIVE MOOD The present tense expresses an existing state or un action occurring at the time in which we are speaking; as-Mi hermano escribe, my brother Botas dimerdias non amains, scrites. Botas dimerdias non amains,

The verb estar can be used with the gerund in

participle : as-

Juan está leyendo, John is Ellos están cantando, they are singing.

The verbs ir (to go) and renir (to come) do not admit of the verb estar coming before their gerund as in the above rule. Thus, we cannot say in Spanish, yo estoy yendo and yo estoy viniendo, but yo roy and yo vengo (I go and I come), I am going and I am coming.

. The imperfect tense is used to express what is past, and at the same time present with regard to something else which is past: that is, it is a past tense which was still present at the time spoken of. It may always be employed in Spanish when in English the word was can be used with the present participle, or used to can be employed with the verb, or when we speak of habitual actions : as-

Cervantes era un escritor ele-gante, Cervantes was an ele-gant swifer. Rerol era un tirano, Nero was reasoned well.

reasoned well.
Ilos unrehuban por las onlies,
coando los vimos, they were
scarching through the streets,
when we saw them. a tyrant. Innido fui mão, hablaba como nião, token I teas a child, I spuir as a child. Ellos mare

It is evident that Sensea reasoned well means . Senson used to reason (or was accustomed to reason) well.

The perfect definite tense shows the action or being affirmed by the verb to be completed at a time of which nothing more remains, often specified by an adverb or some other circumstance expressed or understood : as-

El presidente no le perdonó, file president pardoned him pasada, le received two letters not. not.
Diego vivia cuando le vi, James
sous living token I suo kim.
Escribio tuna carta cycr, he
serote a letter gesterius.

As both the imperfect and perfect definite in Spanish are included in English in what is called the imperiest tense, it is important that the learner should be able to distinguish the use of each in Spanish. When an action or event is entirely past and finished, the perfect definite is used; but when it is meant to say that the action or event was taking place at a certain time, and that it is or may still be continued, the imperfect must be used. Thus, "los soldados marchaban por la ciudad" means the soldiers were marching through the city. and so far as the word marchaban is concerned, they may be marching still; but "los soldados marcharon por la ciudad" means the soldiers marched through the city, and from the tense employed are marching no longer.

The perfect indefinite is used to express an action or event which, though entirely past, has taken

Spanish, as in English the verb to be with the present ' place during a period of time (expressed or understood) of which the present forms a part, or at a time designated in an indeterminate manner; as-

He hablado a Rodrigo esta I have spoken to Roderick this

The past actions of persons or things still in existence, if no particular time be mentioned, are expressed in this tense; as-- . .

El general ha tomado varias The general has taken several cuidades,

The only cases in which the English perfect tense and the Spanish perfect indefinite do not correspond are such as the following :- "It has been snowing these three hours": "he has been in Mexico for these ten years": which in Spanish would be. "hace tres horas que nieva"; "hace dioz años que estoy en Méjico"c which mean literally, it is three hours that (since) it snows; it is ten years that (since) I am in México. If the sentence be negative. the perfect indefinite is employed, as hace ocho dias que no la hemos visto, it is eight days that we have not seen her, that is, we have not seen her for eight days. If the action or event be completed, the perfect definite must be used, as hace diez años que el rey le perdonó, it is ten years that (since) the king pardoned kim.

Hay (or ha) is sometimes used instead of habe in cases like the examples in the last paragraph, as hay pocos dias que entre en el cuerto de mi amigo, it has a few days that (since) I entered into the room of my friend, that is, a few days age I entered my friend's room. Hay is used at the beginning . and he at the end of a phrase, as hay poece dias, or poces dias ha.

The first pluperfect is used to express an affirmation of what is past and took place before some other past action or event or time, expressed or understood : as--

Juan ya habia comido cuando John already had dined tohen Besti Recardo. Richard arrived.

Whenever the former action or event is mentioned as still continuing when the latter occurred, the imperfect tense is employed in Spanish to denote the former; as-

Habin tres horas que ella esta-la juntando cuando llego painting when Peter arrived. ba pant Pedro,

This last example means in English, she had been painting three hours when Peter arrived.

The second pluperfeet is used to express a past action or event that took place immediately before . -another action or event also past. It is never used except after some of the adverbs of time : evando, when ; así que, as soon as; no bien, no sooner, but

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just ; apénas, scarcely ; luego que. immediately after; despues que, sona after ; ne-

Aponas hubo salido cuando se Serrely led he gone out when east la casa, the horse felt.

The first future tense affirms what is yet to be or to take place at a future time (mentioned or not);

Sere presidente, I shall be Lucia vendra manana, Lucy president.

The second future tense affirms something future that will have taken place before or at the time of some other future action or event, or determinate time: as-

Habré e-crito esta carta ántes que Jann Rezae, I shall hare critten this titte i (fore John o'clock,

THE TENSES OF THE IMPERATIVE MOOD.

The imperative is that mood which commands, exhorts, or entrents; as in these examples .--

Hacedlo, do it. Veamostos, let us see them.

The imperative mood is not used in the first person singular; nor is it used in Spanish for forbidding-that is, it is not employed with a negative adverb, but the persons of the present subjunctive are used when a negative command or a prohibition, is expressed : as-

No temas, for not (i.e., may-st No temas, for not (i.e., now then not for)

The s of the first person plural and the d of the second are suppressed before nos and os; as-Congratulémonos, let us con- Congratuléns, coagratulate

gratulate oursetres. The s of the first person plural of the tenses of the indicative mood is suppressed when the reflective pronoun comes after it; as in this

Il'e love ourerlers.

example:-

When the imperative is negative in English, as the subjunctive is employed in Spanish, the pronouns of the first objective case are not joined to it, but come before it; as--

No lo hogas, do (thou) it not. No lo haga ella, bet her not do it. Que is sometimes used before the persons of the

imperative mood ; as-Que uno de nosotros vava. Let one of us go (that one of us

rea y go). The persons of the imperative, except the second persons singular and plural, are to be rendered into

English by man or let, as bendiganos el Señor, man the Lord bless us: vava Juan, let John so. But

U., with its objective cases, although of the third person, is to be rendered as the second person, as venga V. conmigo, come with me (let your worship come with me); alabe-c V., prai.c unwreelf (let your worship praise himself)."

THE TENSES OF THE SUBJUNCTIVE MOOD.

The tenses of the subjunctive mood differ in signification from those of the indicative only in expressing what they offirm in a conditional or daubtful manner, while the tenses of the indicative express certainty Whenever, therefore, there is no doubt about what we aftirm, we must use the tenses of the indicative.

The present tense of the subjunctive affirms some doubtful action or event that may take place, and is generally preceded by some conjunction or conimpetive phrase: a--

Hocel esto pum que ven los this in order that they may vie-tra, but nes olors, see your good works.

As futurity is implied in the present tense of the subjunctive, the first future of the subjunctive may be used in its place; thus, we may say, aunque llorenios. though we may weep; or aunque llorarenios. though we should weep. The pre-ent may therefore be used instead of the inture, and the future instead of the present, unless the conjunction si (if) be employed, in which case the present subjunctive cannot be need.

The relative pronouns are generally followed by the present or some other tense of the subjunctive, when the sentence is interrogative or negative or expresses a doubt, wish, or condition; as-

No conezen mu sola manor I knor not a single woman cuya alima sea mas sensable whose soul (is) maybe marses arbite than that of Mrs. Louder.

Words which in English are compounds of erersuch as quienquiera, whoever : candoniera, whoseever, whichsorrer ; signipre que, whenever ; por mas que, however: por mucho que, whatever-in Spanish generally require the present or some of the tenses of the subjunctive; as-

Por grande que sea in mênto. Houver great that the merit

The imperfect tense of the subjunctive affirms an action or event of a doubtful or contingent kind as having to be, or to be done, or as conceived by the mind as having taken place at some time under certain conditions; as-

Juan leerm, si tuviera libro, or Joko tembl remt if he should : Juan leerm, si tuviese libros, have (if he had) books,

. In both Spanish and Euglish the future is sometimes used as a command, as no materie, the a shell not hill, i.e., do not Liff, or slo not commit saurder.

COMPARATIVE ANATOMY.—XIII.
(Continued from p. 124.)
VERTEBRATA (continued).

FISHES (continued).

THE limits of these lessons will not allow a description of the skull; it can only be said that it may merely consists of cartilage more or less hardened by a deposit of carbonate of lime, or the cartilaginous boxes may be covered by a number of thin hones.

Thath .- True osseous teeth are found in all the classes of the Vertebrata. The teeth of fishes are generally osseous and plentiful. They present in different fishes a variety of interesting forms, In the perch they are so slender and minute as to resemble the pile of velvet. In the Chretodontide,* a family of bony fishes, the teeth resemble bristles, whonce their name. These fishes are numerous on the rocky shores of warm climates. and are often beautifully and variously coloured, One species of this family, the Chelmo restratus, an inhabitant of the shores of Asia, possesses the faculty of shooting insects with drops of water projected from the mouth, and solving thom as they fall, The well-known pike (Emz) has its mouth crowded with innumerable teeth, both sharp and formidable."

The teeth are attached to the bones surroughing the month by uneans of ligamentous tissue, but are not placed in seekers, like those of the higher Vertebruts. They are frequently movable the teeth of the shark are arranged in several rows, the teeth of the shark are arranged in several rows, the teeth of the shark are arranged in several rows, the teeth of the shark are arranged in several rows, the teeth of the shark are arranged in several rows, the teeth of the shark are arranged in several rows, the teeth of the shark are arranged in several rows. It is a shark at the shark are the shark are also at the shark are the sh

When Steme first examined the teeth of the sindri, he was surprised to find a great number of teeth placed on the inside of each jaw, Jying close to the bone. From their peakles and arranges close to the bone. From their peakles and arranges and the sindring the si

The admentary cand consists of a simple tube, which passes nearly straight through the body. The gullet is short and muscular, and the stometic large, separated from the intestine by a small valve or curtain. Sometimes the stoment, as in the lighting (Fig. 37), presents a series of tubular promotions, which terminate in blind extremities.

* xaira , a bristie ; deore, a tooth.

The inner membrane of the shark's intestine is arranged in deep spinls folds, which wind from end to end. The compartments between the spinl layers communicate through a small aperture in the centre of each valvular projection. The object of this appeal arrangement is to increase the surface over which the natrient material of the food has to pass. The valves are kept apart by means of an intercening objective through the present; and kidners likewise.

The breathing-apparatus consists of a number of loose fringes or gills suspended in eavities, and attached to bony or cartilaginous arches; three or, four, or more, being fixed on each side of the neck. Matteucci estimated the surface of the gills of the common ray to measure 2,250 square inches. The cavity in which the gills are suspended communicates both with the month and the outer surface of the body. The water is taken into the month, forced through the inner aperture of the gill cavity, where it comes into contact with the gill fringes, bathing them freely, thus acrating the blood which circulates through the minute blood-vessels of the leaflets (Fig. 87). The water is then expelled through the outer aperture, which is guarded by a valvular curtain.

Most fisher pesses an nir-bindado, which constitute communicates with the guilt or stomach. It is furnished with a nuscular apparatus to regulate its especify, so not increase of clinical tito specific gravity of the animal. Some anatomists consider gravity of the animal. Some anatomists consider it to be houndegous to the lungs, its principal such lowever, is, as Willoughity long age (1685) pointed out, to bring their bodies to an equilibrium with the element in which they wrim, to enable them to impale ou move themselves in any direction.

The circulatory apparatus consists of a heart with a double cavity and blood vessels. The upper earlity, the auriele, is thin-walled, and regaines the blood from the velus. The lower cavity, the ventriele, is thick and flexiv. By contracting upon the blood it drives it to the gills to be affrated, and theree into the large vessels.

Merrous System.—The brain of falses is small, and made up of a single and three pairs of little masses of nervous matter. The single one is panned the cerebellum. The anterior masses give origin to the nerves of the sense of small. The organ of small is the same as that of ni-breathing animals, except that it is in contact with water.

The middle pair of masses represents the convolum of higher minals. The posterior afford origin to the nerves of sight. The shape of the eye varies considerably in different fishes, but in all the transverse diameter is largest. The size is not in proportion with the body of the fish—for example, the salmon's eye is smaller than the haddock's. The eye is flattened in front, so that in some fishes it is almost half a sphere. The pupil is

large, so as to take in as much light as possible, but generally motionless.*

The torpedo and electric, eel (Gumnatus electrious) possess an electrical apparatus, which' they can discharge at will, communicating a shock to any animal with which they come in contact. Humboldt relates that he saw two borses killed in five minutes when exposed to the at-· tacks of the electric eel. This eel is a native οĖ the warmer parts of America, South Demerara, Surinam. etc. The sensation produced by the shock from the electrio fish is exactly that caused accumulated. electricity as developed by the ordinary machine.

The ree or every may be double or fused into one.

When distended it coursies's large portion of the abdominal cavity. The milt, or goft zoe of male fishes, has a similar position, and equals in bulk the ovary of the femines. They are to the bundled up so like the female that it is only in the spawing season they can be distinguished. The ovary is nothing more than a be distinguished. The ovary is nothing more than a bright of the control of t

In the osseous fishes the eggs mas out by means of a small dust which opens just behind the anus, as in the herring. In the cartilaginous fishes, as in the shark and ray, there is a much higher type of generative function. The eggs are extremely "The cel has a transparent herry convex covering at some distance before the eye to defend it from external sceletar.

numerous, amounting to many thousands. Leavenhoeck counted no less than 9,384,000 in a middlingsized codfish. Even in the common herring 60,000

eggs lave been found in a single female. The parent fish usually selects shallow water for the deposition of hereggs; this done, her maternal duties and anxieties for her offspring terminate.

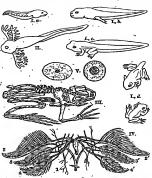
In the last lesson we described those animals which occupy the lowest scale of the vertebrate kingdom, live in water, and breathe by means of stills.

AMPRIRIA.

Proceeding a step higher in the hadder of vertebrate life, we come to those animals which can live either on land or in water, and are on this account named Amphibia (from the two Greek words àuph, both; Blos, 16%), living in two elements. The Amphibia constitute an in-

sing from a suggle ventricle, and a go to the three pairs of gills, 22, ments. The Amphibia constitute an intermediate form of life between the strictly aquatic and the terrestrial surpass. Covier classified them under the name of

and such as the street of Battanhia in his fourth order of Baptilla; but seems zoologists have justly objected to this classification, and now consider them as a distinct division of the Vertebrata. In order to live in two such different modifia as water and air, it is requisite that these animals should be in possession of gills like the fish, and also of that form of breathing-apparators which predominates in the higher forms of vertebrate like, alled langes. The latter consists of membranous parameters of the street of the st



0.82—Autophera, J., (e, b, e, d) Soccessive Hetamorphorid of the From. II. Paropole of From, showing externed oiled. III. Secultion of the From. IV, Blood-vesseld of Taboul of From. Process of the From (Internet MacCollege). Blood Corpolation, Vision Corpolation, Vision Corpolation, Vision Corpolation, Vision III. (fa, to No. in, Figs.—IV. I, artery arising from a ungle ventriele, and dividing find six branches, which go to the three pairs of [in], 27,

animal, may be restored to the blood, and the carbonic eader renoved from it. Nothing on exceed the benisty and extreme delicacy of the nicolanism of the breathing expensatus, which, warloady modified, isseen to play such a useful part in the économy of the bighter animals. The Amphibitis possess the typical characters of the Vertebrata, already described. Like fifthen they are oblished the disciplination of the blood is red and corpuseduced. Fig. 26, Y., illustrated the second of the companion
The Amphibia are divided into four orders, as follows:-

(1) The Uredela, or those with parsistent talk.
(3) The Batrechia, or frogs. '(3) The Gymnephonia, or Amphibia with naked snake-like bodies. (4)
The extinct Labyrinthedonia, so called from the labyrinth-like and complicated arrangement of their teeth.

The first order comprises the newts, salamanders, protous, stem, etc. The second, toads and frage The third, those animals called by Linnaus, Cacilia (access, bilnd). They are, however, not blind, as that naturalist supposed; they have eyes, but very small ones, and nearly bidden mader the skin.

The Amphibia undergo a remarkable change, or metamorphosis, as they advance towards maturity. They are, for the most part, developed from eggs deposited in the water and afterwards feoundated. The resulting young are called tadpoles. In their early stage they resemble fishes. They breathe by means of gills, which project from each side of the body behind the head (Fig. 38, II.). They have no fins, and in their early stage they are destituto of legs (Fig. 38, I., a). As life advances these external, gills disappear, the animal breathing by means of internal gills, which are suspended from arches, and bathed by the water in a similar manner to that arrangement described in fishes. Presently a pair of legs (Fig. 38, I., b) may be seen to grow from the sides of the body. The hind legs make their appearance first, and the fore legs subsequently, in the from (Fig. 38, I., c). This is not always the case with the other Amphibia; for example, in the salamander the order of leg-appearance is reversed. In the siren the hind legs are wanting. As the legs approach towards a state of perfect development, the tail gradually contracts and wastes (Fig. 38, I., d) until it has completely disappeared. During this period changes are taking place in the internal as well as external economy of the body. Nature now prepares it for an extended sphere of action by endowing it with a pair of lungs, by which it is enabled to live either in its native

element or to extend its peregrinations to terrestrial soil, and live there also. This transition from the larval to the frog condition cannot fail to remind the student of another metamorphosis-namely, that which the caterpillar inflergoes to become butterfly or moth. 'In the former the transit is from a strictly aquatic to a double form of life; in the latter from an earthy to an agrial state of existence. It is by such metamorphoses as these that Nature teaches man to aspire to a higher degree of intelligence and usefulness. The lesson comes with an count force from the much-despised tond-whose hoarse . croakings break the stillness of the night in itsquiet reign of darkness over its marshy habitations -as it does from the pretty but irresolute butterfly. basking to and fro in the sunshine of day. In the frogs, toads, and newts the gllls entirely disappear, and for this reason they have been named Cadnoibranchiato Ampbibia.* Others are called Perennibranchiate Aniphibia, from the fact that their gills remain permanently, even after the formation of complete lungs. Such are the proteus and siren : also the axolotl; to which the Mexicans are partial as an article of diot, especially when (as Dr. Baird romarks) dressed after the minner of stowed cols; and served up with rich and stimulating sauces.

The Oreulatery Apparatus—The heart of the Amphiha is indicative of progressive development. It consists of three chambers or cavities. Two of these are reception eavities, and mend the systemic and pulmonary aurioles; the third is a propelling-one, and called the ventricle. The object of the ventricle is to propel the blood to the system and langua—to the system for the purpose of carrying oxygen for the nutrition of the disease, and to the langua so that the oxygen element may be again, the property of the control of the disease, and to the language so that the oxygen element may be again.

It will be surmised that in those animals (for example, the frog, etc.) possessing only temporary gills that, as the lungs usnrp their place, a change must of necessity arise in the arrangement of the blood-vessels. This is the case. When the lungs come into play, the blood is diverted to them and away from the gills (Fig. 38, IV.). In those Amphibia with persistent gills this change is only partial, In the frog tribe the skin also acts as an organ of respiration by absorbing moisture. By reason of this it is enabled to live for a long time deprived of food and air. This fact has given origin to many preposterous tales of toads being found alive entombed in coal-beds and blocks of stone, where they had evidently existed (believe it who chooses!) for hundreds of years.

* From cadness, easily falling ; branchine, gills.

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The digestive and nervous apparatus undergo a slight increase in complexity from that described in the last lesson.

Frogs are destitute of ribs, and consequently have not an expansile chest. This compels them to breathe by swallowing the air. The skeleton of the Amphibla evinces decided advances towards that of the higher Vertebrata. This is very evident in the disposition and conformation of the bones of the limbs-i.c., in those which possess the latter. The skull joins with the vertebral column by means of two condyles.

DEPTITAL

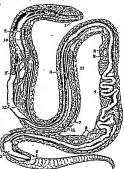
Far away beyond the confines of history-probably ages before the secondary organisation-the earth was tenanted by gigantic species of the class Rentilkt.

In external appearances and configuration the orders of this class differ materially from each other. The Crosedilia have their bodies covered with horny plates embedded in the skin. Tortobes have a complete external skeleton, covered with thinner plates. The snakes are destitute of these thick outward investments, but have scales covering their bodies.

The Teeth .- The dental apparatus varies according to the reptile's mode of life. The crocodiles have long jaws, armed with a single row of conical teeth, held in bony sockets. The Chelonia (tortoises, ete) have no teeth. Their jaws are covered with a horny bill, which serves the purpose of teeth. The teeth of the Ophidia (sements) are not lodged in sockets. In the cobra, rattle-nake, viner, etc., some of the teeth are grooved or perforated by a canal. which communicates with a poison-cland, and serves to convey the poison into the wound made by the animal's bite. The oreging of the canal is not at the extremity of the tooth, but at a point a little above it, so as not to endanger the loss of any of the fluid; man adopts a similar arrangement with his injection-syringe. These teeth are attached to movable bones. When at rest, the poison-fangs are hidden by a fold of the gams. Behind them are radiments of other fangs to replace the former when they are lost. The poison of some serpents proves rapidly fatal to hot-blooded animals when introduced into the blood current through a wound. When swallowed it is harmless,

The alimentary canal presents some differences from that already described in the Amphibia. It is comparatively short, and usually of great width, The gullet is wide and extensible, especially in the snake, which is able to swallow nnimals of great bulk. The large and small lutestines are very distinctly divided, and separated by a curtain or valve. In a tortoise of moderate size the whole

length ot the alimentary canal was found to be . 4 feet. The small intestines were 202 inches, and the large 161 inches, long. The stomach was 2



HEIA. ARATOHY OF THE COUNCY SNAKE (APTER MILNE-ROWAND).

th Frg. -1, longue and glottis. 2, guillet, ent at 2 in show the heart, etc., in sun, 3, stomach; stime; 5, cleans; 6, anns; 7, liver; 5, ovarium; , or eggs; 10, windpaps; 11, principal lung; 12,

inches long. The intestines terminate in a cloaca, which is also the common point of termination of the urinary and generative organs.

The Respiratory Apparatus.-The Reptilia never breathe by gills at any period of their existence, like the two preceding classes, but by laugs. These ate two in number, and made up of numerous cells. usually of large size, aggreented together. In sinkes the lung called the principal lung is much larger than the other, and, in fact, the working lung. The smaller one, called the little lung, is either rudimentary or absent. Tortoises and turtles, like the ribless frogs, owing to their possessing immovable ribs, breathe by swallowing the nir. The reptilian heart consists of three eavities. There is an evident tendency in many to the formation of a fourth, by a septal division of the ventricular cavity into two parts; so that

the blood, arterial and venous, still mixes. In the croeodiles this intraventricular septum is complete, forming a quadrilocular heart like that of the higher vertebrates.

The blood corpuseles are not very numerous. They are oval in shape and of large size, varying from χ_{20}^2 to χ_{200}^2 of an ineh in the long diameter, and χ_{20}^2 to χ_{200}^2 of an ineh in the short diameter.

The brain is of small size in comparison with the skull,

The young of the Reptilia are developed from eggs. Some are hatched before being born, as in the viper. Some deposit their eggs in the sand on river-banks, and leave them to be hatched by the heat of the sun. The egg of the crocodile is about . the size of that of a goose. The turtle makes two or three visitations to the shore in the course of a year to deposit her eggs in a cavity she scoops out to receive them. Her eggs amount to about a hundred at each sitting. She carefully covers them with sand, and leavos them. The mode of development of the reptilian embryo resembles that of the higher Vertobrata. The Reptilia possess a completely ossified skeleton. The skull is small, the greater part of its bulk being made up of jaws, The head is articulated to the spinal column by means of a single condyle. The ribs are numerous in the erocodiles, lizards, and serpents. In the sankes they amount to as many as three hundred pairs.

The vortebra may form a series of ball-and-socket joints, so as to allow considerable latitude of motion. The tortoise is invested by a bony habitation, consisting of two sets of plates, united at the sides, to the inner aspect of which it is immovably fixed. The anterior and posterior extremities are open, to allow the animal to protrude its head and limbs, The upper or back set forms the carapace; the under or vontral, the plastron. The shoulder and pelvie bones, which afford attachment to the limbs, are situated in the interior of this bony house. The neck and tail portions of the spinal column only are free. The bones of the (in Reptilia possessing) extremities are well developed, and approach in character those of the higher Vertebrata. The toes are usually five in number on each foot, movable, and armed with claws.

CLASSIFICATION.—Professor Huxley has grouped the Reptilia into the following orders:—(1) Creesdilla, comprising the modern ercecdities, alligators, and cainans, and the extinct Pelcosauria and belodouts; (2) Lacertilla, lizards, blind-worms, and chambeloons; (3) Ophidla, or sunkes; (4) Cheloria, turtles and tortoises. Besides these, there are five orders of fossil Reptilla.

- ELEMENTARY POLITICS.—II.

NATURE AND OBJECT OF THE STATE.

POLITICAL discussions, as we have soid, tend to go back to first principles. Discussions, therefore, on, the duty of the State in in given case naturally lead was ask what she purposed the State. Suppose the State had ceased to crist, with what object should we naturent to set it was gain? In history this has often been confused with the question, Why and how was the State originally formed?

This confusion is especially refricable during the seventeenth and eighteenth contraire in Bugdand. The unconstitutional teactions of Charles L, bit execution by the Purlian party, the equally measurement of the purliance of the purpose of the purliance of the purpose of the

The Family theories need not detain us long. Their best-known exponent was Sir Robert Filmer. who died in 1647; but his treatise, "Patriarcha," was not published till 1680. His view is substantially. as follows:-The Creator granted dominion over the world to Adam, and again to Noals. Noah's sons partitioned the world among themselves, and their sons did likewise. Each son ruled a kingdom consisting primarily of his own descendants. Gradually the households expanded into societies, but each society was still ruled by the eldest surviving roale of the eldest branch of it. Kingship is only the extension of the power which each father of a family has in his own household. That power is received from God, and the holder is responsible to God alone for the way in which he exercises it. 'His duty is' to provide for the good of his subjects without regard to their likes and dislikes, just as a father might for very young children. When he dies, his power should descend on his eldest son, or to his nearest male relative, by the rule of primogeniture, which (Filmer held) was appointed by the Scriptures: Thus the king cannot be called to account for what he does, and to resist him is to resist God's appointed. deputy.

. We need bardly point out that this theory provestoo much. Certainly Cliarles I. could not have shown that he was entitled to the English throne in virtue of primogeniture as heir of Nonh. Moreover, the extensive nowers claimed by him were no

two ecutories old. For various reas hecause the older nobility, who noted as a check on the royal power, had mostly fallon in the Wurs of the Ross-the kings throughout Europe had practically gained great powers; and powers which had really belonged to the Roman Emperors had been attributed by lawyers to all sovereign rulers. Moreover, the attributes ascribed in the Scriptores to the Kurgs of the Isrnelites had been ascribed by ecclesiastics to the kines of their own time, the . . ritual at whose coronation was partly imitated from the Hehrew ceremonial. The English kings of an earlier period had had their powers expressly limited

. . . by the Great Charter, for instance, But the Contract theories were hardly nearer the truth. It was assomed that men had originally lived togother without any regular form of Government; that thus the strong oppressed and slew tho weak; and that this state of things was so dreadful , that men were compelled to set up some power to keep the penso and to agree to obey it. The nature of the agreement and the powers of the Government were differently conseived by different writers, neeording to the conclusions they wanted the theory to prove. Thus, Thomas Hobbes, in bis "Levisshan" (1651), supposed that the individuals who formed the first society and been so afraid of relapsing into anarchy that they had promised absolu obedience to the Government and given it unlimited powers; and that any sort of interference with the powers of the Government, besides being only unjustifiable, might bring back the terri "state of war, every man against every man," that was worse then any oppression by the Governmont. Hobbes, of course, meant to attack the Com-monwealth. John Loeke, on the other hand (1689). wished to justify the deposition of James II. He therefore argued that the individuals who entered into the Social Contract only contracted to set up a Government in order to defend their "natural rights "-thet is, the claims they had as being men -to life, ilberty, end the means of happi which the most important is property. If the Government elearly eassed to do the work for which it was set up, they were quite entitled to depose it. In France, in the next century, Jean-Jacque Ronsseau propounded a theory-which be admitted represented what ought to be rather than what had cen-which led directly to democratic despotiss It may be stated concisely as follows :-- Man is born free, and yet is everywhere in bondage. The only legitimate bondage, however, is that which he makes for himself. To protect themselves, men agree to join into one body and to transfer to it all their rights and cir rights and powers, and even their property, that it may guarantee to each as much freedom as is consistent with the freedom of the rost. Thus the State obtains the right to do anything to any citizen-to order him to risk bis life, or to take away his property, or to put him to death—if by so doing the freedom of the rest is preserved. The absorption of the individual in the State is so complete (according to Rousseau) that, in voting, he is not even expressing his own will. For he has no longer a will. He has surrendered it to the State. But us the State has no single intelligence or mind, each individual citizen must express his opinion as to what it thinks and wills. A vote is the expression of this opinion.

Deductions from Rossean's theory were the principles of the French Revolution; but they were generally used to destroy the old régime or to get rid of political opponents, rather than to guarantee individual liberty or to construct a new society.

Now it is quite certain that no State was ever founded by express contract. It would be a very difficult matter to prove even that new colonies have ever been based on an implied contract. They started as subjects of some other untion, or when they became independent, the old system of government went on with some modifications. Most of the inhabitants probably never thought of contracting to sabmit, on certain conditions, to their Government. They took it as a metter of course. But a grenter objection to all these theories is that they trent the State tee much as a collection of individual atoms. But a State is not formed by the combination of individuals who have previously lived in no society. The States we know have grow an out of very small beginnings, in almost all cases largely by conquest and force; and the individual pers have negatived the notion of free co during their association with one another in the State Individuals in early times have their life regulated for them-by custom end tradition-oven in minute details; the notion that they can regulate their own lives, and the life of their nation, is a product of many generations of civil government. The very ideas on which these contract-theories are based-that ell men are by nature equal, thet a society is a collection of rational beings striving to secure n common good, that men are originally and naturally free and happy, and that they themselves set up a Government to seoure their freedom and ess-are not the ideas of uncivilised man at They are the product of centuries of civilisation and government-in particular of the Greek philosophy and the Roman law which these on

In fact mon have lived in societies over since they existed at all, not because they agreed to do so, but because they could not have lived separately.

if they had tried. A society is often compared to a living organism. And there is, in fact, a close resemblance between them. The society lives on while its individual members change, just as the . matter of which a living body is composed is in a constant state of change. The society, like the body, contains different parts with special functions. Part of it produces nourishment and means of living for the rest. Part directs and orders the rest, as the brain directs the muscles. The society, like the individual, has a defensive mparatus, and an apparatus for cetting rid of injurious matter, in the shape of the criminal courts, the prisons, and the executioner. Moreover, in modern societies, we find much more specialisation of parts-especially in the industrial department-than we do in less civilised societies; inst as higher animals are far more specialised than lower.

But we must beware of carrying this analogy too far. A society can never be nearly so specialised in its parts us one of the higher unlimits is. No man, and no class, is engaged solely in furnishing nourishment, or solely in thinking, as parts of tho minual hody are. Every member of society has not only his own special activity, but a number of other activities as well. The intelligence of a society is not confined to one class. It is suread through all classes, and particularly so in a modern State. There can never be one "social brain," other parts of the society meanwhile having no sharo in the general lutelligence. And herein lies one justification of popular government or demoeracy. The intelligence which is diffused through all classes can only be got at by allowing all classes to express their opinion by a vote, and by embling them to min as much information and discuss political questions as freely as possible.

But in proportion as this is done more thoroughly, the State will become more and more like the sort of State that Locke and Houseon sketched outat least, in its broad general aspects; for many of Houssean's details are fanciful and impossible. The members will recognise more clearly that they are united to strive to obtain a common good-liberty not sounly to do as they like, but to make the best use of their faculties and to enable other people to do so. They will recognise that to obtain this common good, submission to the law is unavoidable. and that even extensive restrictions on individual rights and individual liberty to do things not in themselves learnful may be desirable to further its attainment. They will see that the broad general lines on which they are to proceed in attaining it are laid down, either expressly or tacitly, in the Constitution of the State, and that as the good itself cannot be defined in precise terms, there is no means of deciding certainly on any proposed measure except by estimating its probable consequences. And they will understand tuth—atthough it is no floods necessary to leave one's parliamentary regressurative very great freedom of action, since he has more time and means of knowledge than nost of his constituence—yet primarily they are to consider, less what sort of policy he proposes to support.

FUNDAMENTAL NOTIONS CONCERNING THE STATE, Primarily, then, a State is a body of men living together on some one territory and subject to some one anthority, whose business it is to promote their common good-that is, to ensure (so far as it can) that every citizen shall be free to make the best use of his powers, and develop himself to the best of his ability. This authority generally has not been set up al first by the citizens. But as civilisation advances it lends to exist by the tacit consent of the citizens. They may not have formally agreed to set it'up, but they frequently make changes in the details of its arrangements, and nobody can doubt that, if a large majority of them chose (for instance, if the authority went beyond the customary limits of its action), it would be physically possible for them to upset it. This authority is called the Sovereign, and every member of the community is its subject,

measure of the community is as supper.

We must be very careful not to confound the
Sovereign, in this sense, with the person at the head
of the State, popularly called "the Sovereign," but
whom we shall here call "the Crown." The Queen,
for instance, is not. "Sovereign" in the sames that
she alone has power to issue general commands
to be rabilets, and enforce obletione. So slagel
European monanch has such a power except the
Cart of Rav-ia.

The business of the Sovereign is (1)' to issue general commands or laws to its subjects. (2) To judge when these laws have been broken, and to secure that if one member has injured another, the damage shall as far as possible be repaired; and to resent breaches of the criminal law, which are offences against its own dignity, by punishments, technically called "sunctious," or artificial cylls following disobedience. (3) To provide that these laws are carried onl. This includes such very diverse kinds of actionas providing for the defence of the State from foreign enemies by keeping upon army and mavy, providing for the safety of individual members of the whole body by keeping up prisons and police (many of these functions are, of course, delegated to local authorities), providing inspectors to see that such laws as the Education Acts and Factory Acts are carried out, and so on. The Sovereign does all this by its agents—the officers of the Civil Service and of the Army and Navy, the judges, and other officials. These it either appoints, or, much more commonly, delegates their appointment to agents. Thus the appointment of judges is delegated by the true Sovereign, mominally to the Crown, really to the duriesers of the Crown.

To find the Sovereign in a State, then, we must ask—What person or body has (by general consent) power to issue general commands, and enforce their acceptance?

In Bagland this power is possessed by Parliament (that is to say, the House of Commons, which consists of representatives elected by the hilk of the male population—a section, helity of the poorest class, heing excluded by laws imposing certain Lords) and the Grown. The reducal by any one of these to agree to a proposal prevents its passing into law. But in practice, when the House of Commons is determined on a measure, it has been the outsom for the Crown for a century; and a half, and for the House of Lords for half a century, to be proposal prevents are supposed by mallo orbitols.

A law proper is a general command issued by the Sovereign, enforced by penalties, and relating to a class of actions to be performed by a number of people.

Under such a law, rights arise; that is. A being ordered by the law to observe a certain kind of conduct towards B, A has a duty to B and B has a right against A. These are legal rights, and lawyers know of no others. But every law contemplates that a certain kind of relations will arise between the persons affected by it, that each shall be freed from interference of the rest in certain ways. Now, suppose we take a wider view, and regard the world as intended to be-a Kingdom of God, ruled by the Divine Law, which aims at the good and happiness of mankind; and suppose that it is the duty of earthly Sovereigns to carry out in the way they think hest the purpose of the Divine Law, but that the world being wicked, the Divine Law is often departed from. Then the Divine Law will give us certain broad general outlines of the relations which ought to exist between men, and of the claims which each man, because he is God's creature, is entitled to make against other men. These claims will be his "natural rights," the rights that result from his vature as a man.

Now this Is the sort of notion which the Contract theorists had. They regarded States as arising to carry out the broad general outlines of the Divine Law—to make men do their duty towards their neighbours, at any rate so far as to avoid doing them harm. (More than this, it was held, the State could not effect. It proceeds by telling its subjects what they are not to do which is comparatisely simple in comparison with the task of telling them what they are to do.) The object of the State, therefore, is to preserve "natural rights."

Now the objection to this theory is that "natural rights " are far too vague to be described. Nobody has ever tried to specify them all. Nor can anyone say when (as a general thing) the right of one person is overridden by the rights of a number of others. If a railway company proposes to take a house, whether the owner chooses or not, is his "right of property" to prevail against the "rights of other people to the pursuit of happiness," which may be immensely increased if the railway is constructed? If a man is just going to kill me is his "right to. life" to avail against mine? If a man is sending his own ship to sea, is his "right to do what he likes with his own property" to be so respected that he may overload it to the endangering of other people's rights to life? And so on. Generally, therefore, the supporters of "natural rights" have had to suppose that individuals tacitly resign to the Sovereign-hody. of which they form part, all their rights and the power of judging when they are injured, and that their rights are only granted back under the reservation that the public welfare overrides that of the individual. Still, if we are to look at the business of government as moral at all, we must conceive it as carrying out the moral law, whether we regard that law as revealed in the Bible or as written in men's consciences, or as discovered from observation of what conduct best promotes happiness. And if we bring in the moral law, we cannot avoid introducing the conception of moral or natural rights. But we cannot get much farther than the bare conception.

In the Constitution of the United States and some of the original State Constitutions, reference is formally made to natural rights in the preamble; but as the State Constitutions have been gradually revised, the mention has been dropped.

In theory, all law arises from the direct command of the Sovereign. In practice, there are two other great sources of law—Custom and the decisions of Courts.

Many usages grow up without any express command of the Sovereign, and then when they are firmly established are reofgnised as part of the law of the land. The customs of different trades as to the notice to be given before dismussing an omployee are firmling instances. The custom of lifters in different part that the court is the state of the court of the year that the court is considered in the court of the onested of such custom. Again, no law can possibly be worrhed so as clearly to provide for all the cases possible under it. The legislator cannot foresee the circumstances which may arise. So, when a dispeted case arises, it comes before the Courts, and the judge interprets the law. In so doing he very other proponness on a case of which the legislator had no conception, and so adds to the law, or, even alters it. There are cases in which the law has been so worded that it in Interpretation has really defracted the object simed interpretation has really defracted the object simed and the contract of the con

Now the Sovereign might alter any of these additions by statute; when it does not, we must infer it approves of them, and that they are to rank as its commands and be enforced by its officials. It is therefore a maxim, "What the Sovereign permits, it commands."

Constitutions, Written and Unwritten. - The general principles which regulate the form of Government and the way the work of Government is carried on, together make up the Constitution. Most modern States have formulated these principles in some kind of document, and established some special authority whose business it is (amongst other things) to decide alleged cases of the violation of this Constitution. In England this has never been done. Certain agreements between the king and the people-the Great Charter in particularoertain laws of special importance, such as the Acts arranging the duration of Parliaments and the mode of their election, or the Act settling the Royal Succession, and certain usages which Governments habitually observe-for instance, that a Ministry either resigns, or dissolves Parliament if a vote of want of confidence in it is passed-together make up the Constitution. But there is no authoritative statement of the Constitution as a whole, and no Court or other body anthorised to say wbether it is violated: while Parliament may at any moment alter any part of it. Now, where written Constitutions exist, they are usually enacted, not by the regular legislature, but in some other way, and the regular legislature cannot (at any rate by itself) alter them. Indeed it may be said that in such cases the regular legislature is not the real Sovereign; but a body to which the real Sovereign-the power which makes the Constitution-delegates the legislative power usually. As the power of the English Parliament—unlike that of the American Congress, for instance—is formally unlimited by a Constitution, it is the fashion to talk of the omnipotence of Parliament. Practically, of course, we

recognise that some laws are much more important than others, and that some ensumes of political action would in practice be much harder to disregard than some statutes are; but theoretically English law makes no distinction between one statute and another.

THE SPHERE OF GOVERNMENT.

Should the Government of a State try to promote the welfare of its subjects directly, or should it limit its action to keeping the peace between themprotecting the persons and property of each from injury? And if it should try to promote their general welfare, how far may it safely go? Ought it (for instance) to choose a religion and require them to adopt it? ought it to compel them to be educated in a certain way? ought it to punish them for doing actions which concern themselves almost entirely (for no action concerns a man's self absolutely), such as getting drunk? Or, bearing in mind that very nearly all that a modern Government spends is raised from its subjects by taxation, is it entitled to provide institutions for its subjects which many of those subjects do not care about. A local authority may impose a rate on its members (provided the majority of them agree to it) for the purpose of building baths, washhouses, or free libraries. Now many of the ratepayers, especially the richer ones, have no use for the so institutions. Is it fair to make them pay part of the expenses?

Now the stricter forms of the Social Contract theory, its elsen, would limit the action of the State in this direction very considerably. The State (the supporters of such a theory would say) is an assielation formed to protect its citizens. If it does anything more it goes beyond its soop, just as a company formed to make a railway would be exceeding its powers if it took to braving bear. Its members set up a Government to preserve their liberty of action, and anything that involves intarference with this liberty defeats the object of the State.

When the Coutract theories were most generally believed in, however, most of the more modern questions as to State interference had not yet been raised. (Coesdoully, the theely was used as a regument that the Government cought not to interfere in religious questions.) Besides, the Contract theory must necessarily imply that the State has a right to do anything which will seem the maintenance of the Contract. It may, for instance, compel its members to serve as soldiers or to go through military training; or it may enforce compulsory dehanded and sanitary regulations, with a view of, preventing injury to the State as a whole by ignorance or ejedencia disease; indeed, directly indeed, and the contract of the co

we alimit that the State must first of all protect, and that a great deal of protection must be of the nature of prevention, we shall find it difficult to

draw my line limiting the functions of the State.

States have however. frequently tried to promote the nositive welfare of their subjects. Thus, in France early in the last century many 210005508 o f manufactureand trade were reguinted by inw. Inspectors saw that the laws were kept, and there were heavy penalties for diobedience. The object was that manufacture should be carried on in the last possible way. and that French mananfactures should be preferred to these of other patients It resulted from the "patriarchal theory" of Government held by the official classes in France at that time, that it was the duty



br. Gurs's, Chierlicati.

of Government to provide in every way for the positive welfare of the people. It was assumed that the Government generally was much wiser than the people, so that it was its duty to do anything it could for them that seemed likely to be beneficial.

ENGLISH LITERATURE —XV.

JOHN Milton was born on December 9th, 1608. He was spring of an old family; but his father, having 181 edopted the tenets of the Paritan party, had become separated from his kinefolk, and had maintained himself and his family, earning a competent fortune by

musuing mainess of a serivener, a term which in his day denoted one employed in the responsible office of negotiating investments for money. The poet was born in London, but his childhood and early youth were passed for the most part at his father's countryhouse at Horton. ln Buckinglumshire. His father was blmself a mun of education and taste, and an accomblished mu-«ician; a Puritan in religion, and with, no doubt, those political sympathics which distinmished the Paritans as a party from their religious opponents. him wo may presume that Milton receired his earliest edu-

cation. He was then at St. Paul's School, in London; and thence he passed to Chies's College, Cambridge, in 1623. Of the details of Million's life at the university we know little with certainty. Although Million was all his life a student, with lum, more than with most men, it would be insecurate to contain which most men, it would be insecurate to do the obscudent; tell, in mure have made and and an early of the years he persent a Cambridge. For Million was one of that years have made and the obscudence of that small number of men of the lightest order of gemms whose powers have shown themselves at an extremely early age-

Almost from boyhood he was a poet, as well as a scholar; and almost from boyhood he seems to have been fully conscious of his extraordinary powers. After leaving Cambridge, Milton spent some years at his father's house. The cause of his passing this period of seeming inaction is not far to seek. Milton had been originally designed for, and himself contemplated entering upon, holy orders; but he was deterred from carrying out his intention by a repugnance for the intellectual restraints which such a course would have imposed upon him. And we can easily imagine that, to a mind as keenly alive as Milton's to the responsildlities of life, the choice of a new course was mot the work of a day. Upon some such ground he himself afterwards explained the seeming loss of these years. They were not years, however, of idleness, but of predound study. In 1638 Milton went abroad, and spent more than a year in the enjoyment of the society, and in cultivating the friendship, of the most eminent men of letters-of the Continent, and especially of Italy,

This visit to the Confinent forms the close of the first period of Minovi Beraryhistor. However, better that of the three horsens a man of extraordinary learning, of the merican languages and Hierarchie to was a consumante master; nor was be less familiar with the living tongers. In Huly, the most entrangle another of Karope, his posses, but half and Italian, occuring general argument and markers. In these lessons, we have specially to do with hum.

There are few pasts whose productions more charly reflect the life of their author than Milton's. Not that his works, his poetical works at any rate, contain many direct references to himself or his ulstory; such notices are few. But the spirit and character of his works change with the changes in the spirit and circumstances of the man. The period of Milton's life which we have been hitherto describing was one of tranquillity and repose. His toils were those of the student. He had not yet been drawn into the vortex of religions and political controversy. His works of this period are exclusively poetical. They have all the music which belongs to everything be ever wrote; he shows the same learning, and the same mastery over his learning, as in later writings; the same pure and severe moraday, and the same spirit of reverence. But in these carlier poems the whole tone is different from that of the later one. The prevailing spirit is a keen enjoyment of the beautiful. They have a light-heartedness which for Milton never returned. He still lad k rare for .

"Such sights as youthful poets drain."
On summer eyes by finanted stream."

He had not yet learnt the Puritan horror of the stage. Even in his pensive mood he would-

Sometime ict gorgeons Tragedy In sceptred pult come sweeping by, Presenting Theirs or Pelops' line, Or the tale of Tray divine."

Unlike the Milton of later days, who was too rigid, too self-contained to join in the public services of any religious body, he could still write—

"that let my due fect never fail."
To malk the valutions clotherly pole;
And lose the light entouved roof,
With nathege plints mavey proof;
Gallier of the results of the proof;
Californ of the religion light.
There let the pealing argue those,
To the full-voiced quality-to-low,
To the full-voiced quality-to-low,
In wreth which and antiference stars,
As may with avera mess, filtering to make ear,
Newdy we have reduced.

[Beach of the revenies, the start of the proof of

We can only briefly mention Milton's poems of this his first period. Passing by a free early works in some of which the inflamence of Spencer is apparent, we come to the great Odo on the Nativity. This magnificent ode is said to have been written be Milton at the age of twenty-ane.

To the same period belongs the copulsite pown of "Lyckins." It was written upon the death of an intunet college friend of Milton, Edward King, who was downed in the Irish Chanale, while upon his vegace from Chester to Dablin. The pown has something of the utilical chonnel can duractly which night be expected in one composed under such circumstances. It is practical in forms the yame man whose death is lamented is a followscaled in the strike.

> "To sether todh, ore the high dawn appeared, that r the opening cyclids of the morn, We strove a da bl."

The pod introduces all that liceograms instance a linger, and people the stance with that variety of sorred and mythological personages, Clristian and heathen, to which we are assessment in pastoral party. The poem has no passion in it, and little that appeals to the cardious, but for beautiful party and parteet harmony of numbers there are few which run be taked on the same bear.

The "Marque of Counts" was founded upon a trivial incident which occurred in the family of the Earl of Inidexenter, who, as Lord Predefent of the Websh Marches, lead his residence at Lauthov Castle. His daughter, with her two bruthers, lest their way in a wood; and this slight circumstance gave rise to the beautiful poem of "Counts." This graceful poem is framed upon the model of the Masques of Josson and Fletcher of which we have already spoken. It differs from its predeces-ror in the predilar elevation of tone, the moral dignity, which Mitton has thrown into it, as into everything clse that he ever wrote. This piece was acted at Laullow Castle by members of the noble family upon whose posed by the celebrated muschan Lawse, who aboacted a part in the parce. The keynote of the poem is the beauty of virtue and purity, its superiority to circumstances, and the divine protection which attends it.

b Virtue could see to do what Virtue would.
By her own radiant light, though sun and moon Were in the great sea stuck.

Upon this subject Milton lavishes the richest and most varied chapmence, interspersed with songs of a "Dario delicacy" which is marvellous.

The "Masque of Arcades" is somewhat similar in character to "Conne," but it is as inferior to it in merit as it is shorter in length

But of the peems of this the first period of Mittoric scarce the most remarkable, and probably the most undersally enjoyable, are the companion pieces, "L'Allerien" and 'll Powenters," the order of electricities and pursuits of the cheef has must, the other of the pensher man. It would be of poetical beauty compressed into the same space as in these two short poems. Every work courses a picture, and the risythm of every line conduces to the large-sized not which is to be produced.

When Milton returned to England after his short sojourn abroad, it was no longer to enjoy the peaceful repose of the scholar and poet. Henceforth we have to do with him for some years as a prose-writer, one of the most eager and most bitter combitants in the controversies which then stirred men so profoundly. His sympathles as a Puritan would naturally have been on the side of the Parliament and against the King, on the side of the Nonconformists and against the bishops, But Milion was no mere partisan of any of these causes. He was the champion of liberty-liberty of thought, of speech, of worship, of action, Liberty was the passion of his life. "Liberty's defence, my noble task," was his work in life. He resisted the dogmetism of the "new pre-byter" as strongly as that of the "old priest," and resented the intelerance of popular opinion as keenly as that of the State.

We cannot examine Milton's prose writings in any detail; but the student ought to understand something of their general character, and we treat of them now as a class because most of them belong to this period, though several are of a later date. The greater part of them relate to thoe great subjects of controversy, in which Miton took an active part—the controversy as to Church government; that as to discover; and that as to the right of which of putting the King to death. In the first of these controversies he engaged almost immediately after his tetum from alread. Several Presbyteriam ministers had published a treatise bearing upon Church government, under the title of Smeetynman, a name formed from the initial of Smeetynman and the second public means of the second public means the second public means that the second public means the seco

Into, the divorce controversy Milton was led through the circumstances of his own domestle history. His first wife was Mary Powell; thusmarriage was undarpy, and at lost site left her hashand and returned to be father, and only came make to her house when it was plant that Milton lands to her house when it was plant that Milton to the liberty of divorce and re-marriage which he consistently ministrained.

In the third main controversy in which Milton engaged he appeared as the champion of the people of Enchand, to defend their conduct in putting Charles I, to death; his chief opponent being the celebrated scholar La Saumaise, or, in the Lathiest form, Salmosius.

These controversial labours, however, by mems represent the whole fracts of Million's labours during this period of his life. For some years after this return to England he supported binself by keeping a school for loop, in London. In 1640 he was appointed to the important office of Latin the control of the Commonwealth.

There still remain a few hedated proce works of Mitton, not relating to any of the great centroversies of the day, which must not pass numeticed. The must important of these are an unfinished Illivory of Bughard, a "fractate or treature on Education, and ejecially the "Acceptifics," a Education, and ejecially the "Acceptifics," a last is the greatest of Mitton's proce works, and has is the greatest of Mitton's proce works, and not which every student of Baglish Hienturengulate ostandy, for it exhibits the characteristics of his style in a peculiar decree.

Nothing can be more complete than the change which the Restoration wrought in the position and prospects of Milton. Up to that time, whatever his personal enhantics, and they were heavy, he had lived in keen enjoyment of the triumph of that cause for which he had fought so long and so strenuously. His position was a singularly trying one. He was growing old; he was blind; the work of his life was undone; the republic for which he had struggled was overthrown; the hated monarchy, and the still more hated prelacy, reestablished; the lefty though mastere morality of the Paritan supremacy giving place to the unbridled licentiousness of the new régime. Milton himself narrowly escaped being juclided in the list of those sacrificed to the royal vengeance. A proelamation for his discovery was even is ned; and more than one of his works was burned by order of the House of Commons. But Milton's was not the spirit to sink in despendency. The same lefty purpose and proud self-reliance which he had shown in the earlier days of conflict did not forsake him in this hour of defeat. The few remaining years of his life were passed in close retirement, for the most part in London; and during these years his greatest works were written.

We know, from Milton's own pen, that from a very ourly age he had entertained the thought of writing a great epic or heroic poem. We know, too, that, probably under the influence of his favourite master. Spenser, he had at one time chosen the story of King Arthur for his theme. though there is no leason to suppose that he ever actually commenced any poem on this subject. "Long choosing, and beginning late," as he himself tolls us, it is probable that many other themes may have passed through his mind before he finally determined upon the sublime history which he has embodied in "Paradise Lost." Even when his subject was chosen, the form and character were not at once determined upon. We know that Milton at one time intended to represent the fall of man in the form of a sacred drama; and it is related upon authority which we can searcely question, that some of the noblest passages in "Paradise Lost," and notably Satur's celebrated "Address to the Sun," at the commencement of the fourth book, were written as part of the intended play. But in all probability the substance and form of the great work must have been selected, and probably portions of it written, before the Restoration, though it was mainly composed after that event. It was probably completed, and there is no reason to doubt, completed much as we now have it, in 1663; and it was unblished in 1667

No English poet, no poet, indeed, of any nation, has over ventured to treat so vard, so, awful a theme as that which Milton has handled in his great cpic. He has painted the calm screnity of heaven before sin or disord had found entrance: the war in heaven; the robellion and fall of the dissolution angage; the horrows of the hell to which they fell; the erecution; the temptation and the fall of man; the panishauend of the guilty pair, and their peniteneo lightened by the hope and promise of a finter redemption. He has ton-hell the most awful mysteries—the loftiest connecle of heaven and the lowest depths of hell—no less than the history of the lumnau race. He has easyed to

"Assert eternal providence, And justify the ways of God to men,"

Nor has he sought in vain to rise " to the height of this great argument," For, whatever his faults, Milton has done what no other poet could ever have dune; he has, throughout the whole of his long poem, minimizated a subline elevation of thought, of moral tone, and of style worthy of his subject. Some of the means by which this effect is attained we can easily perceive. Milton's genius was essentially not dramatic; that is to say, he had little power of conceiving, portraying, and giving life to individual characters. And this, which for most purposes would have been a defect, was for this poem an immense advantage. Had the awful personages by whom his beaven is peopled-the Eternal Father, the Divine Son, the great archangels, and all the hierarchy of heavenbeen presented to us too vividly, with too much dramatic life, they would have been too like ourselves: the juffuite would have been lost in the finite, the Divine in the human; heaven would have become earth. But one power which Milton did possess, and that in a very rare degree-as he showed in his early poems, "L'Allegro," in particular-was the power of minute, delicate, and accurate painting of scenes and incidents. This power he carefully abstalus from using in "Paradise Lost," In that poem all is vast, shadowy, indefinite; and by this vagneness of outline Milton adds grandeur to his tigures, as mountains are grandest when half veiled in cloud.

Nothing can surposs the masterly art which Mitton shows in the coulted of his story, especially the skill with which he preserves a complete unity of interest throughout the whole, and, in spite of the inherent difficulties of his subject, maintains that movement and netton which are above all things resential in an opic poon; and this is anchored minishly by making status and his sub-continuits spirits the overtill figures of the poem-continuity spirits the overtill figures of the poem-continuity spirits the certain figures of the poem-continuity spirits the expension of the soled angels from their heavenly bone, and we so how Satan.

"With his horris over Lay varquished, rolling in the fary gulf, Confounded, though immerial ";

1. 1. 30 mm S

Confounded, though immerial *: hero---

"A dungoon horrible on all sides return As one great furnace fixmed, yet from those fixme No light, but rather durhant stellor, thereof only to discover sights of one. Regions of accuracy, dolotful dandes, where peace And rept can nove devel, hope never comes That excess to all."

Asima, inside himself from the labor of first work, and ty well received interpret of the revent in the property and byte. The several bedges of the host, all the cell spikes of a spike, and not of the host, all the cell spike of a spike, and the cell spike of the

"And herd by, henging in a golden chain, This pursuant world, in higness as a star Of smallest magnitude, close by the moon."

And so the record book closes. It must be observed that by the world, in this and other passages, Millon menos, not the earth, but the plobe which he supposed to embrace the whole older and stellar cystems, for his asteonomy was about the contract of the supposed to embrace when he had been been as the contract when the stellar contracts the supposed to have been dead to be take of the supposed had been and the enterprise of Rother; the approaching fall of man, and the Drivine purposes of mercy to be sufficient for his utilizate reclamption.

are disolosed to us. The poot then again returns to Satun, and traces his wanderings till he kands at least on this earth upon the top of Monat Nighntes. In the fourth book Satun, wandering over our globe, course upon the Garden of Eden, and sees our first parents in their state of innocences and



Come Marrow (Chara the Ministers by Strange Conner)

Site. "And their capelling purchases, warring of the forest when Adm and Park in Stokes, and he is for the time driven on Strain." And the stokes, and he is the time driven on Strain in Strain, and the first time driven on Strain in Strain, and the strain of the Stokes, and the strain of the Strain of Strain, and the strain of the Strain of Strain, and the strain of Strain

meet with those two awful shapes, Sin and Death, no longer guardians of the closed gates of hell, but hurrying to this earth, there to find the prey won for them by Satan, and leaving in their track a firm and easy road between earth and hell. Satan in the meantime returns to reinte triumphantly in hell his success on earth; and he and his associates begin to feel the first-frults of the curse by finding themselves transformed into scipents. In the eleventh book the repentance of Adam and Eye is accepted in heaven; but the archangel Michael is sent to expel the guity pair from Paradiso. this and the twelfth book the prohangel, leading Adam to the summit of a hill, shows him in vision the history of his posterity, ending in the final redemption of mankind through Christ. The book nd the peem end with the netual departure of Adam and Eve from Eden.

In a work of such magnitude it is hardly neces sary to say tint oven Milton ims been by no means uniformly successful in ail parts of it. The scenes uniformly successful in all parts of it. The scenes in heavon are the least satisfactory. In pursuing his purpose "to justify the ways of God to man," Millon has sometimes placed in the mouth of the scarcely tend to exalt our idea of the Divine character. And the scenes which present to us our always fuli of purity and beauty, have certainly something of monotony, if not of dulness, about them Action there could, of course, from the nature of the case, be none in such seenes, and the unchanging round of life seems tedious to fallon humanity. It is in the other world that Milton's success has been supreme. The true action of this opic is with the fallen spirits; the real interest of the peem centres in the character and neblovements of Satan. It is a trite remark that poets whose genius is not of a dramatic character are apt in portraying their heroes to show us themsolves under various disguises; and in the majestic portrait of the rebel Satan it is not difficult to trace some of the fentures of the rebel Milton. For Satan is no devil of the vulgar, no mere spirit of evil, compounded of baseness and malignity. He is an "archangel ruined"; a form and conn-tenance of celestial beauty, though marred by sin and deformed by wounds and flame; n conracter of which the basis is a lofty courage which no adversity can shake, a "comage never to submit or yield"; a stern determination and fixity of purpose, though these noble qualities are perverted by "pride and worse ambition." He is still capable. of a magnanimous devotion, and a tender pity for those whom his example has brought to ruin. Even for his viotims, Adam and Eve, whon he first sees them, he is not without compunctious visitings. He can still "feel how awful goodness is," and stands silent and abashed in its presence.

When Milton wrote "Pnradise Lost" not seem to have at all contemplated a companion The idea of "Paradise Regained" was suggested to him by a Quaker friend, Ellwood, to whom he had shown the finished manuscript of the earlier poem; but Milton at once adopted the suggestion, and in four years after the publication of "Paradise Lost." "Paradise Regained "nappeared. It is a much shorter poem, consisting of only four books, as against the twolve of "Paradise Lost." It has plways enjoyed much less popularity than the earlier peem, not from any poetical inferiority, but from the nature of its subject, which is didactic rather than opic. It is essentially a companion As the climax of the action of "Paradise piece. As the climax of the action of "Paradise Lost" was the tomptation and the fall of Adam, the subject of "Paradise Regained" is the temptation and victory of Christ :-

"Recovered Faradise to all mankind, By one man's firm obcollence fully tried Through all temptation, and the tempter foiled in all his arts, defeated and repulsed, And Eden russed in the waste wilderness."

Abother great work of the same ported is the drama of "Samure A gooliests." This play is founded upon the classical model of the Greek impedies. It is not only very noble and elevated in spirit and clamstonic, but contains seenes and the same possible of the sa

There still remnine a clims of Milton's peems, the consideration of which we have postponed natil nice, for they belong to so one period of the post seems that a constraint of the post seems the a form of composition which had already been califivated with much success in England, been califivated with much success in England, and Spenser. But the somests of Milton differ from those of all his predecessors in the peculiar concentration of thought mod elevation of feeling and congraphible sausies of their language and versification.

 Milton died at his home in London in the year 1674, and was buried in St. Giles's, Cripplegate.

STATUTE DOOR PD There is one great poet still to be spoken of, with regard to whom it may well be doubted whother be should be classed with those of the period now ander review, that of the Civil War and Commonwealth, or with thouse of the new era which began with the Restoration. Butler's great work was published wholly after the Restoration; indeed, it could hardly have been safely published before. But it is probable that it had been in great part written many years before; and, at my rate, the longer and more active portion of his life was passed during the civil conflict and under the passed during the civil conflict and ander the Commonwealth: the principles, the sympathics, and habite of thought which we find redicated in his rovice were formed moter his severe discipling of the confidence of the confidence of the confidence of the Restoration. And in subject his green work citalized by belongs to the up of Paritian supressney. Of the personal history of Sonneel Battle we know very little. He was born in 1021 to the village of Strensham in Worcestershire, his parents being probably of humble mak and in needy circumstances. He received his early education at the Grammar Solool at Worcester. In early life he appears to have noted as block to a Mr. Jeffreys, appears to bave noted as block to a Mr. Jeffreys, a magistrate of the county of Worcester. Subsequently he formed one of the household of the Countess of Kent, in what capacity is not qoite clear; and here he engaged the friendship and society of the great Seldos, a man not less ominons for the nobility of his character than for his learning and ability. At a later period Butler resided—it would seem as amanueusis—in the house of Sir Samuel Luke, a Cromwellian officer, an ardent republican, and a strong Presbyterian. Sir Samuel Luko undonbtedly furnished some features for our author's portrait of Hadibras; and his life in Luko's author's portrait of Hndibras; and his life in Luke's service was now, wo may presume, a happy one. In truth Butler's life was throughout a hard one. He was a Royalist and a devoted olnavolman. He hated the Paritans: their nesterity repelled him; their frequent commones of thought and manners offended his tasto; their theological controversies excited his contempt; their religion seemed to him hypo-crisy; their arrogance, narrow-mindedness, and pedantry were disgusting to him. Yet it seems to have been bis fate to spread meet of his life among Paritans, poor, dependent, the servant of the very men whom he hated. It was not till towards the close of his life that he found his revenge. In "Hudibras," at last, he poured out all the pent-up bittorness of years. The Bestoration gave victory to the cause which Butler had always espoused, and three years afterwards, in 1663, he published the first part of "Hudibras." The second new was

published in 1661; and the third in 1678. Immediately upon the publication of the first part of the great satire, its success was established; it became the fashion of the day. But Butler himself resmined without any solid reward, and he died in London is

1900, it is said in extreme powerly. With which against a contrast assistance are conlited by the said of the contrast assistance are controlled by some manus Butter emerging 15 sequenting to the contrast and the contrast assistance are consistent and literature. He opportunities, to an elesistent and literature. He opportunities, to an elsistent and literature. He opportunities, to an elcision and literature. He constructed to statute ever, as of this owner part energy and construction to situate of the contrast and the contrast and the contrast part of the contrast part of the contrast and the contrast part of the contrast and the contrast part of the con-

anti-Paritan side of the great conflict of its author's days. Its object is to present the Puritan party in the most indicrous, the most edious and con-temptible light. This is effected by describing the character and advantares of the vec heroes of the poom, Sir Huddisms, the representative of the the poem, Mr. Rudhoms, the representative of the Presbytorian section of the Puritans, and his squire, Ralph, who represents the Independents. It has sometimes been suggested that Butler was largely indebted to "Don Quixoto" for the conception of his satire; and no doubt the idea of cheesing a knight and his squire as the heroes of the poem was suggested by the great Spanish satire. But beyond this there is nothing in common between the two works. In fact "Pickwick" has much more in common with "Don Quixote" than "Hadilarus" has. Quixote is the picture of "i noble mind o'erthrown"; n character really brave and oblyshrom, but rendered helicross by its illuone; n cureer essentially noble, but out of place.
additions is the portrait of n creature utterly base. neens, faist, and covardly, a hypocrite and a prelimit. every into in the description of this third in any led, is designed to render them not merely ridicalous. but hateful and contemptible. Every comparison which Butler's fertile imagination could devise, wash Dates's 'errine imagnation could suggest-ie directed to heighten this cafect. "Halibras" is is directed to heighten this effect. "Halibras" is the lifterest, and by far the most learned, as well as one of the most humorous of entires. The peculiar jingling metre in which it is written is admirably suited for the subject.

APCHITECTURE, -XIII.

THE ENGLISH RENAISSANCE.

THE introduction of the Renaissance style in England follows very much on the same lines as that built—the first results of his Italian training. On the other hand, owing to the bringing over to England of Italian artists by Henry VIII., we find the introduction of classic ornament in tombs and small features as early as 1512; so that there may be said to exist a century of transition in England. The

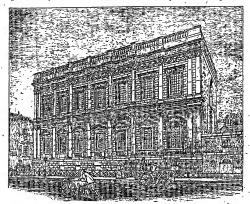


Fig. 48.—The Banqueting House, Whitehald. (From a Photograph by Bedford, Lemere & Co.)

wide we have already described in France. In both countries there cristed the traditional Indinace of the Gothic style of building; and the absence of the work of the countrie charge remains, such as are found in Romes and various parts of Indy, returned in both the acceptance of that pure plausor the style which is known as the Italian. We have seen how in France already in 1560-48 the Italian style was unployed in the Lowre, Paris. In other parts of France, ancher fitteer, evan puse before its findence is recognised. In Ragiand, we have to watt till 1610-50. When Intigo Jones returned from his second visit to Rome, we find in the Banqueting House at

first building in which we find classical ornament is Layer Marney Hall, in Essex, which was completed in 1505. Among the artists brought over were two architects, John of Padas and Theodor Havenics of Ciercs. To the latter is due the design of the classical control of the control of the control of the former, portions of Longleui; but the exterior was remodalted about 1507–80 for Sir John Thymn, possibly by Robert Smithson, who atterwards designed and carried out, under John Thorpe, Wollaton Hall, Nottinghamshiv. In both cases, the details are so pure that is is probable they were taken from the Knowle House, Korn, and Killyt Hall, Nottinghams sinte, are both attributed to John Thorpe, an architect of great eminence, to whom also we owe Holland House, Hatfield (Fig. 50), and Audiey End. The truss usually given to the Transitional period in England are Elizabethan and Jucobean. The characteristic features of the style are; the bracking up of the form a frontispiece to a central projecting block. This is found in the Bodleian Library and in other colleges at Oxford.

The first introduction of the Italian style is found, as before observed, in the Banqueting House, Whitehall, by Inigo Jones. In this building the

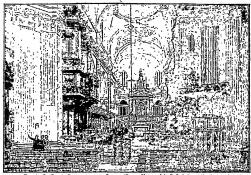


Fig. 40 .- Sr. Part's Carpennal : THE CHOIP. (From a Photograph by F. G. Q. Stuget, Southampton.)

wall surfaces by projecting wings, centre-pieces, and bow windows, and the large windows divided by mullions and transoms-all features derived from the later periods of Tudor Gothic. In many buildings we find a flat roof, which must be an Italian introduction. Not content, however, with the cornice or balastrade, the centre and side wings, and sometimes the window-heads, are crowned with compositions of pierced stone-work, rising ten feet or more above the roof, and which is known as strap-work. Similar work is found crowning the numerous sixteenth and seveteenth century tombs in Westminster Abbey and elsewhere. The lofty roofs which exist in France are not found; in fact, the sixteenth century roof is of less inclination than in the Gothic period. One of the quaintest conecits of the style, and which must be ascribed to mere pedantry, is the grouping of the orders superimposed one above the other to

classic orders are employed in the same way as a those to which we have already referred in Italy by Vignola and Palladlo, and which in England Is, known as Palladian. Inigo Jones was a great admirer of this work, and in the villa at Chiswicke erected for the Dake of Devonshire he adopted portions of a design by Palladlo for the Villa del Logran can Vicenan. Is would be difficult to find buildings more unsuited to our climate, with spread portions and small windows, such as in this and larve works which we find introduced into England at this seried.

We have hitherto spoken only of secular buildings for the simple reason that, owing to the suppression of monasteries at the Reformation and the very large supply of churches which had been built by the Roman Catholies, there was no further need of any ecclesiastical buildings; and had it not been for the great fire of London, which burnt the oid Early-English eathedral of St. Paul's and so miny of the London churches, we might have waited nimost to this century before churches of any importance were required.

Sir Christopher Wren was in Paris when the great fire took place, but he burried back to London and at first turned his attention to a general plan for



A, Cholderey, T., Dreveling Room; c; Lord Salideurys Bell Room; ; Staby; ; Stabuler Drawing Hoods; K., Marbi Hall; x, Korili Hall; x, Golice Hoom; x, Elward's Office; C Sietoma's Hoom; x, Pantry; o, Ritches Half Store; x, Myrd Hoom; x, Lone; r, Lore Peveling Hoom; x, Chaplin's Room; x, Lore Room; x, Adv Roem; x, Asi Dreving Room; x, Grapin's Room; x, Golice Room; x, Stab Stabuses; S, Adon and New Stab; control, and the Company of the Com

renrrangement of the streets round St. Pnul's, which, if earried ont, would have solved for all time one of the greatest difficulties with which the City has now to contend-viz., the narrow thoroughfares in its most orowded parts. In 1773 Wren was instructed to prepare plans for a new cathedral; the first design he produced, and of which a model exists in the South Kensington Museum, in its plan and internal effect would have been far finer than the one carried out Externally, however, the dome overpowered the rest of the building, which consisted of one storcy only, the walls of which were decorated with Corinthian pilasters with entablature, and au attic storey somewhat resembling that of St. Peter's at Rome, on which it was probably based. It was possibly the want of height in this design that led Sir Christopher Wren in the second design to substitute a second storey in the place of the attic storey, and although to a certain extent portions of this are sham walls which mask the buttresses of the nave, choir, and transept, few are probably aware of this fact; so that the deceit, if it may so be called, is never recognised. The second design was completed and accepted in 1775. In comparison with St. Peter s in Rome, the nave and aisles are apparently larger. owing to the increased number of bays-the dome.

instead of being carried on four piers as in St. Péters, rests on eight: the internal proportions of the dome are finer than those of St. Peters, and although there is an internal and external shell, with a difference of fity fact vertical height between them, still the internal height is too grent to be seen properly from the nave (Fig. 49).

The exterior design is far more successful, and the grouping of the western cupolas and the central dome are in outline and composition the finest in Europe.

COMMERCIAL CORRESPOND-ENCE.—X.

[Continued from p. 182.] FRENCH, GERMAN, AND ENGLISH.

FRENCH, GERMAN, AND ENGLISH. 56.—FORM OF ENGLISH POLICY OF MARITIME ASSURANCE.

IX THE NAME OF GOD, Ameu. Messes, N.N., as well as in their own name as for and in the name and names of all and every other person or persons to whom the same doth; namy, or shall apperfinin, in part or in all, doth make assurance, and cause themselves and them, and every of them, to be insured, lost or not lost, in and from London to Riga, fineliciality and the season of the control to the c

and also upon the body, tackle, apparel, ordnance, munition, artillery, boat, and other furniture; of and in the good ship or vessel called the Mary, whereof is Master under God, for this present voyage, N. N., or whosoever shall go for master in the said ship, or by whatsoever other name or names the same ship, or the master thereof, is or shall be named or called; beginning the adventure upon the said goods and merchandise, from the loading thereof aboard the said ship and craft in the river Thames upon the said ship, etc. (here follow list of carge and value of each item), and so shall continue and endure, during her abode there, upon the said ship, with all her ordnance, tackle, apparel, etc., and goods and merchandise whatsoever; until the said ship shall be arrived at Riga, and upon the said ship, etc., and until she hath moored at nuchor twenty-four hoars is good safety; and upon the goods and merchandise, natil the same be there discharged and safely landed. And it shall be lawful for the said ship, etc., in this voyage, to proceed and sail, to, and touch and stay at, any ports or places whatsoever, for all purposes, and with liberty to take in and discharge goods at all ports or places she may touch at without being deemed any deviation, and without prejudice to this assurance.

The said skip, etc., goods and merchandise, etc., for so much as concerns the assured, by agreement between the assured and assurers in this policy, are and shall be valued at . . . to pay average on each 10 bales of cotton of following numbers or on the whole of each mark and species of goods. Touching the adventures and perils which we the assurers are contented to bear, and do take upon us in this voyage, they are: of the seas, men of war, fire, enemies, pirates, rovers, thickes, jettisous, letters of marque and countermarque, surprisals, takings at sea, arrests, restraints and detainments of all kings, princes, and people of what nation, condition or quality soever, barretry of the master and mariners. and of all other perils, losses, and misfortunes that have or shall come to the hurt, detriment, or damage of the said goods and merchandise and ship, etc. or any part thereof. And in case of any loss or - misfortune, it shall be lawful to the assured, their factors, servants, and assigns, to suc, labour, and travel for, in and about the defence, safeguard, and recovery of the said goods and merchandise and ship, etc., or any part thereof, without prejudice . to this insurance; to the charges whereof we the assurers will contribute, each one according to the rate and quantity of his sum herein assured. And it is agreed by us the insurers, that this writing or policy of assurance shall be of as much force and effect as the surest writing or policy of insurance heretofore made in Lombard Street or in the Royal Exchange, or elsewhere in London. And so we the assurers are contented, and do hereby promise and bind ourselves, each one for his own part, our heirs, executors, and goods, to the assured, their executors, administrators, and assigns, for the true performance of the premises, confessing ourselves paid the consideration due unto us for this assurance, by the assured, at and after the rate of ten shillings per cent. . In witness whereof, we the assurers have sub-

scribed our names and sums assured in London. N.B.—Corn, fab, salt, fruit, flour, and seed are warranted free from average, unless general, or the elip be stranded. Sugar, tokoco, hemp, fax, hides, and skins are warranted free from average, under the pounds per cent,, and all other goods, also the slip and freight, are warranted free of average, which was the contract of the contract of the slip and freight, are warranted free of average, which is the stranded spec cent. unless general, or the slip and freight are contracted from the stranded free contracts.

(Hero follow the names of the underwriters with the amounts.)

57.—FORM OF FRENCH POLICE D'ASSURANCE MARITIME.

Aujourd'hui le . . . entre nous soussignés, L . . négociant demeurant à . . d'une part et . . . (la compagnie générale des assurances maritimes de ce port) . . d'antie part, a été convenue et arrêtée la police d'assurance qui suit :

Le sieur L. d'éclare avoir churzé (tonneux de vin de Dordenux) et q'u'il évalue à la soume de france la pièce, ce qui fait au total la soume de france la pièce, ce qui fait au total la soume de france, sur le narive en chargement au port de capitaine de le ledit navire partant du port de pour on il fern son déchargement, ne devant toucher de relèdie tolontaire (qu'il) daquel chargement il justifie par un double de lui cettifié, du connaissement à lui deut double de lui cettifié, du connaissement à lui deut de la deut de la deut de la deut de la compangia générale, et et qu'il a remis à d'la compangia générale, et e.

Les risques à charge de . (In compagnie, etc.)
assureur, courront à partir du moment où
(le pilote inmaneur quittem ledit navire
après l'avoir mis en mer) . et finiront
(seulement au moment où le navire sera mouillé
dans le nort de sa destination).

Les parties ont fixé of déterminé la prime d'assurance à payer par le sieur L . . à la compagnie . . à la somme de . . co qui est à rison de . . pour cent, lequel paiement sera effectus dans les . . (tronte) . . jours de la nouvelle do l'arrivé dudit navire à sa destination.

(Les parties se soumettent respectivement, quant à l'exécution de la présente police, à tout ce qui est present par les bois maritimes et le code de commerce, en matière d'assurance; et en cas de contestation elles déclarent s'en rapporter en dernier ressort à u décision de Mossicurus S. L. et M. . qu'elles nomment à cet effet leurs arbitres, et maibles compositers, leur donnant tous pouvoirs à on nécessaire, même celuit de choisir un autre qui le cas de contestation arrivant, ne pourrait ou ne voudrat en connaîtres.

Fait double à . . jour, heure, mols et au susdits (Signatures)

58.—FORM OF GERMAN SEE-POLICE.

Wie is Llatergefigneren beretunten hiertweg für uns und für bet unter Sechstungsfehrt, ball von ein gert von und für bet unten bei finiem Rausen angegeben. Smann, Berfigberung aberennunch geben ein Seren angefe, auf tagist zu W. Schafft gefährt von Schffer und und geficht von Schffer und und Bereitstelle und und bestehe Serent.

Die au biefer Berfigherung für und und v. Berfigheten abgeleitenen Rochtigen für zu beihämmer nach ein zu despitziehens Rochtigen für zu beihämmer nach ein zu despitziehens Rochtigen für zu beihämmer nach ein zu despitziehen Berfigherung- die Stein Zeifel, inderfeinere auch im Berfigher Greinigung in die beite Zeifel, inderfeinere auch im Rochtigen Freinigung zu der die d

Befonbere Anzeigen ober Bereinbarungen.

Diefe Berficherung gilt nur für Seegefahr., Diefe Berficherung ift gefchloffen burch . . .

So gefcheben ju . . ten . . ten . . 18 .

59.—BILL OF EXCHANGE.

1,500 Frs.

Bordeaux, February 12th, 1899. Six weeks after date, pay by this first of exchange

Six weeks after date, pay by sins list of exchange to the order of M. Laflitte, the sum of fifteen hundred frames, for value received, which place to account. CHARLES GONDEMAR.

Messrs. Smith and Son, Nancy.

Bon pour Frs. 1,500.

Bordeaue, le 12 férrier, 1890,
A six semaines de date, payes par cette première
de change, à l'ordre de M. Lafflite, la somme de
quinze cents francs, valeur reçne, que vous passerez
suivent l'aris de

CHARLES GONDEMAR.
Messieurs Smith et Fils, à Nancy.

%, 1,500.

Borbeaur, 12. Februar, 1899.

Seche Wechen tato jahlen Sie gegen trefen Brunn Wechfel an tie Errer tel Berm Laffitte ten Betrag von fünfzennumbert Kranten, Werth erhalten, nut fiellen folden auf Nechnung laut over ohne Bertigt.

Charles Gontemar. Serren Smith unt Sebu, Naufa.

60.—PROMISSORY NOTE.

4.000 Frs.

I promise to pay on the 1st of March next, to the order of Mr. Nord, four thousand francs for value received by a bill of exchange drawn by him this day on Messrs. Louis & Mocquard, of Lyons, payable on the 1st of April.

CH. COURTIER,

Brussels, July 20th, 1898.

Bon pour Frs. 4.000.

Je paiera a premier mars prochain, à l'ordre de M. Nord, quatre mille francs, valeur reçue en une lettre de change qu'il m'a fournie, par lui tirée ce jour sur Messicurs Louis & Mocquard, de Lyon, payable au premier avril.

CH. COURTIER.
Fait à Bruxelles, le 20 juillet, 1898.

8t. 4,000.

4.000 Frs.

l'ordre de

mn I. Marz bezohle ich an bie Orrer bes herrn Roch wiertanfent Branten, Werth erhalten in einem Wechfel, heute von ihm auf herrem Louis & Moonuare, Loon, ber I. Topel grechen.

Briffel. 20. Juff. 1898.

61.—BILL OF EXCHANGE,

Lyons, June 24th, 1898.

At two usances, pay this first of exchange to the order of M. Latonr, four thousand francs for value received in each, which place to account.

' FRANÇOIS DUPONT.
Bon pour Frs. 4,000.

Lyon, le 24 juin, 1898.

À deux nances, payez par cette première de
change, à l'ordre de M. Latour, quatre mille francs,
valenr reeue complant, que vous passerez suivant

FRANÇOIS DUPONT.

Pron, 21. Inni, 1898. Un gwei Daten gabien Gie gegen tiefe Deinna an bie Deber bes berem Latour viertaufenr Branten, Werth baar eihalten, ju unfern Laften.

Be. 4,000.

POLITICAL ECONOMY.—IX.

FREE TRADE AND PROTECTION.

WE-bree shown that international trade is barter , of goods for goods, and that it involves an interactional divide of production, each country tending to produce on production, each country tending to produce what it is best fitted for, though, frequently special elementances may prevent its producing all the things it could produce best. And we said early in these lessons that the ideal of the economist was complete freedom of production and trade throughout the world, the greatest possible

possible interchange of products. Now, " protection to native industry" (that is, putting duties on foreign goods so as to prevent their being sold at the same price as the home-made article) runs counter to this ideal. It is true that special reasons 'may sometimes be alleged for it which are outside the sphere of economics proper. Thus, it was supported in the last century partly on the ground that war might break out at any moment, and a country might then have much of its foreign commerce out off, so it might be advisable for it to produce most of what it consumed. It is supported in America now on the ground that some European goods are produced by workmen who do not live early so well as the American workmen; and that if these goods are allowed to come in and compete with American-made goods, the American work can only compete with the foreigner by sacrificing part of his wage, and so reducing his bigh standar of living to the low level of that of the latter. Most probably this argument is mistaken; the highestpaid labour is often found to be the cheapest in fact (as we have explained at p. 277, Vol. VII.), and "the strong do not usually require protection ngalust the weak." Protection is also supported on grounds which are more strictly economicthat variety of industry is good for society; and that, were the luternational division of labour strictly carried out, some of the wealth-producing capacities of a country would never be developed at all. The United States, for instance, and Canada have great mineral resources; but in their early days agriculture promised a more speedy profit on capital; and, had trade been left golte free, many of these resources would hardly yet be opened up It takes time to build railroads and work mines, and people do not care to wait many years for their profits when they can be sure of a large return on their enpital at once. And Protection bas sometimes been supported on the philosophic ground that the less a country is dependent on foreign countries, the more mark is its national character and the patriotism of its inhabitants. The most extreme and absurd form of this view was put forward by the German philosopher Fichte enrly in this century. He suggested that the foreign tudo of a State should be entirely in the hauds of the Government, which should keep it down as much as possible, admitting only such foreign goods as were absolutely necessary; and that if possible the inhabitants should renounce the rest, and content thomselves with home-made substitutes-for coffee, silk, and castor oil, for instance l This view reduces the arrament to an absordity, but milder forms of the same idea now often appear in Protectionist arguments, especially in America.

international division of labour, and the freest

Now, as was said in lesson L, Political Economy does not give practical conclusions, but suggests ecrtain principles on which we may form practical conclusions, though in doing this we may have to take special circumstances into account which are ontside economics. In the last century there were strict laws interfering with the shipment of British goods in foreign ships or in British ships manned partly by foreigners. The chief chiect of these restrictions was to encourage the employment of apital in building English ships and engaging English seamen, in order that in time of war English seamen might be available for war-ships. If there were no other way of manning the navy, we should probably all say with the great free-trader, Adam Smith, that "defence is more important than opulence," and that the restrictions were quite right. But as the navy does not now ordinarily draw its crews from merchant ships, these laws have been abolished. Such a renson for Protection is a special reason ontside economics. But nurons the principles economics suggests for guldanco in

dealing with this question are—

(1) International trade being burter of goods for goods, if we want to increase our home production, that part of it which is exported can best be increased by giving greater facilities for importing—i.e., taking off duties on imports.

(2) The person whose advantage is to be considered is the consumer; for everybody consumes certain kinds of goods, but only some persons are concerned in producing a particular kind of goods, and the capital and labour so concerned would ventually—though not without considerable difficulty and inconvenience—be diverted into some more profitable employment.

The people who usually support Protection are mostly capitalists, and sometimes workmen. conned in producing the kinds of goods which suffer most from foreign competition. Naturally they look ou the question from their own point of w. But in the interest of the nation, we should look at it from the point of view of the consumer. The admission of foreign corn duty-free cambles each of us to spend less on bread than if it were taxed, and to have more money to spend on other thines To put a duty on oorn was to make the . profits of corn-growing higher than they would naturally have been, and, by raising the price, to make the consumer have less to spend on other things and less to save : so that the capital of the country did not increase so fast as it might otherwise have done."

* The difference between the Free Trade and Protectionist point of view may be illustrated by a little story. Representatives of England and Austria were once negotiating a contends to draw capital and labour into trades which are not naturally profitable, but which are levied on the product in question. This is to enmade profitable at the expense of the consumer. Very frequently they are not profitable, in the long run, even after they are protected, because the "Protection" they are under raises the profits to such a tempting floure that more capital goes into the trade than there is scope for, and then competition brings down the profits. If left alone, capital will seek naturally profitable channels. If "protected," it will be drawn into employments made profitable artificially by taxing the consumer. Then the national wealth, the national capital, and the national power of employing labour will increase less rapidly than they would otherwise.

"Very good grapes," said Adam Smith, " can be grown in Scotland in forcing-houses, and very good wine may be made from them, at a cost of about thirty times that of imported French wine. If this be absurd, so is it absurd (only in a less degree) to produce anything at home that can be more cheaply produced elsewhere." But the world outside of England does not see its way to take this commonscase view even now.

The high wages which occur under Protection seem tempting; but it must be remembered that it is nominal wages rather than real wages which are high. It is quite impossible to protect one set of trades only; directly one set is protected, others begin to demand consideration; and as Protection tends to raise price-though this tendency is sometimes checked by the competition of inventors, who to satisfy the demand for goods at the old price reduce the cost by better methods of production-the cost of living becomes greater, that is, real wages tend to decline. For, as we shall presently see, indirect taxation tends to raise the price of the goods taxed by more than the amount of the tax. And when once protective duties are put on, so many people are interested in keeping them up that it is very difficult to get them taken off.

We may notice that foreign Governments frequently encourage special manufactures (e.g., beet sugar) by giving a bounty on the export of the

mercial treaty by which each country bound itself to reduce its duties on certain classes of goods exported by the other, The English representative suggested that Austria should admit English herrings duty free. "What will you give us in exchange for this privilege?" asked the Austrian. more herrings, of course," was the reply. But the Austral could not see the question in this light, because he took the old-fashioned view that the great thing for a Government to aim at is to get markets abread for the national products, and that promoting the convenience and comfort of its subjects generally is quite a minor point

(3) Economically, Protection is wasteful. It product, Originally they professed that the bounty was merely a return of the taxes that had been courage a special trade at the public expense. -

TAXATION.

The action of Government on the accumulation of wealth in the country is so important for good or evil that some economists deal with it by itself. Undoubtedly, however, the most important way in which a Government can exercise this influence is by taxation; and we shall confine ourselves to this part of the subject. The influence of the action of Government on the national wealth would indeed require a very large book to itself.

The main principles of taxation as laid down by Adam Smlth are four in number :-

(1) The amount paid in taxes by each oitizen ought to be proportionate to the benefits he enjoys

from his membership of the State. (2) The amount each citizen pays should be so estimated and imposed that he can ascertain

clearly what it is. (8) Every tax should be paid at the time and in the manner most convenient to the taxpayer.

(4) Every tax should be so contrived as to take as little as possible from the taxpayer beyond what it brings into the State.

Taxes are commonly classed as direct and indirect. A direct tax is paid in the first instance by the person on whom it falls ultimately. An indirect tax is paid in the first instance by some other person than the person who ultimately pays it.

Thus the English income-tax, with some exceptions, is a direct tax, . But the daty on tobacco or any other oustoms duty is an indirect tax, because it is paid in the first justance by the importer and he puts it on to the price of the goods; and the consumer ultimately pays it in the price.

It will be noticed at once that rule No. 2 above makes in favour of direct taxation as against indirect. So, in fact, does rule No. 4, for this reason, that some time elapses between the importation of goods and their purchase by the consumer; and that every trader concerned has in his turn to advance the amount of the duty on them, and wait to recover it from the next purchaser. He, in fact, requires more capital to trade with than he would otherwise; he expects to make interest on this capital; and so the price to the consumer tends eventually to be raised, not only by the amount of the daty but by a share of the interest on all the extra capital which the existence of the duty has caused to be employed in getting his share of the goods to him.

Rnles 3 and 4 are partly complied with by tho device of bonded marchouses. Dutiable goods are HEAT. 207

stored in these by the importer, and the duty is only paid when the goods are taken out. Thus the importer may pay the duty on a carge bit by bit, as he sell- portous of the goods; and so be can early on his business with rather less capital and need not advance the duty on the whole at once; while if the goods are re-shipped to some foreign country, he never pays the howe duty at all.

One great objection to Protection is that it encourages indirect as against direct taxanton. Some forms of indirect taxanton conflict with rule. When a duty affection is sharped—that is, a cuty proportioned to the value of the goods imported—the soft of the value of the goods imported—and the customs officials as to the value differ widely; and, of course, notifier is infallible. So that either the importer or the Government is extremely likely to be unfairly treated.

. Adam Smith's first rule (it must be noted) is the mere ideal. It may be interpreted as meaning that rich eithems ought to pay more in proportion their means than poor—that (e.g.) the income-tax ought to be progressive—though this is objectionable in other ways, as interfering with the natural increase of capital; or that a certain minimum income, representing the nocesserines of life, should be exempt from taxatlon. But equality of sacrifice (though very desirable) is hardly attainable.

Taxes on rent (in the conomic sense) and succession duties are among those most favoured at prevent; the latter because it cannot be said that at prevent; the latter because it cannot be said that at person has an absolute moral claim to dispose of his property after his own death, though for various reasons it is desirable his wishes should be followed. But as he would not have been able to accumulate property at all but for the extraence of the security assured to it by the State, it seems fair that the moment when the property does not absolutely belong to anyone.

The desimbility of taxes on ground rents has been holty dispeted. Mr. George's scheme, before referred to, of a tax equal to the real seems to burden one kind of property unduly with all the weight of taxation—which, however fair it night be if society vere starting afterli, is hard on the present owners would yield them an income. Still there is no doubt text much of the value of land is due to the increasing demand for it due to the increasing demand for it due to the growth of society. And it is argued that as society has executed the value it should share in it. It is true other kinds of property often rise in value of society, and it is argued that as society has executed the value it should share in it. It is true other kinds of property often rise in value of society, and it is argued that as society has created the value it should share in it. It is true other kinds of property often rise in value of society and the society of the contraction of the society of the real society of the real society of the
10 ishlity of such strokes is a great encouragement to the prosecution of some industries of great use to society—mining for instance. The question bristles with difficulties, and its solution must be the work of the future.

We have only been able very briefly to touch on some few of the leading points connected with taxation. It must be the object of an elementary work on Political Economy rather to indicate problems than to soke them, and to suggest general principles which may guide the solution.

HEAT. - III.

COLD PRODUCED BY EVAPORATION.

WHEN water is converted nute vapour, much heat is rendered latent. The porous water-bottles so frequently used in hot weather act in this way: a portion of their contents slowly percolates through the unglazed ware and emporates from the surface, absorbing from the vessel the heat required to convert it into vapour.

If other or any volatile liquor be dropped on the hand, a sensation of cold will be at once produced, and this will be felt more distinctly if the hand be waved about, or a current of air be driven over it, so as to accelerate the evaporation. The same thing occurs to a less extent with water. An important application of this fact is now made in surgery. A stream of facely divided other spary is blown upon any part of the body, and by its rapid evaporation any part of the body, and by its rapid evaporation are part and the body in the product of the reduction of the surgery of the contradict insensible to the cut of the surgeon's kinto. In minor operations this plan of producing local insensibility is frequently adopted.

By the arrangement shown in Fig. 18 water may be frozen by its own evaporation. A shallow vessel, filled with strong shiphuric soid, is placed under the receiver of an air-pump, and over it is supported a thin metal vessel a, containing water. As soon as the nir is exhausted, vapour begins to rise, and the vessel would speedily become charged with it, did not the soid absorb it as first as it is formed. The temperature, and this continued a learner to the state of
Some vapour is given off at temperatures far below the boiling-point. The air, in fact, is always more or less charged with it. There is, however, a certain limit to the amount it can contain at any temperature, and if, when it is fully charged, the temperature fall, a portion of the vapour is precipitated in the form of rain.

The point at which this vapour in the air begins

to be precipitated is called the dev-point, and the temperature of this depends upon the amount of vapour present. When on a clear night any objects



For. 15

become cooled below this point, the air in contact with them deposits its moisture, and they become wet with dew. Hence, as will be seen, it follows that those objects which radiate heat most freely teactive most daw.

Fig. 19 shows the instrument used for ascertaining the dow-point. A glass tube has a bulb blown at each end, and one of them, Δ , is partly filled with ether.



Fig. 19

This has been boiled and the tabe sealed while the vapour was issuing, so that no air present. Inside this limb is a delicate thermometer; the other limb, B, is wrapped round with meatin. Ether is now dropped upon this, and by its evaporation lowers the temperature. A portion of the ether in A distal over, and the temperature of the liguid, therefore, distributed as a faint so the base weather and the temperature of the liguid, therefore, distributed. As I shall said the blue workload, and the contributed of the said that the base when the property of the said of

glass. An ordinary thermometer on the stand of the instrument shows the temperature of the air, and the difference between the two is thus easily

LIQUEFACTION BY PRESSURE AND LOW

By means of very high pressure and extremely low temperatures all gases have been liquefold. Carbonic acid, when exposed to a pressure of about thirty atmospheres, becomes a liquid, and if this be allowed to secape into the air, if forcess by its own evaporation, and becomes converted into fakes responding snow. When these are mixed with other, the evaporation is very upind, and in intense degree of cold is produced, so that mercury may easily be and other gases, which prior to 1817 were considered permanent gases, have since been liquided by low degrees of cold and high degrees of tressure.

RADIANT ENERGY FROM HOT BODIES.

Another effect of heat is to produce light. Ordinary flame affords an illustration of this fact, the heat arising from the chemical combination being the source of the light. Metals, too, when exposed to a high temperature become luminous. A low red heat is usually assumed at from 1.100° to 1.800° F., while a dazzling white indicates from 2.500° to 3,000° F. There is, however, great difficulty in measuring these high temperatures with any degree of accuracy. Wedgwood's pyrometer is sometimes employed for the purpose; it consists of metal bars placed about half an inch apart at one end, but a little nearer at the other. Clay cylinders are then made of such a size that, when baked at a red heat, they inst fit the wider end. When exposed to a very high temperature, they contract, and the extent of the contraction is shown by the distance they pass between the bars. The air thermometer is, however, more reliable in its indications. A platinum vessel filled with air is exposed to the source of heat, and the expansion ascertained by suitable means: from this the temperature is easily deduced.

If a powerful electric carrent to made to passalong a thin pattom wire, it will render it whitehot, and a considerable amount of light will be produced, showing again the luminous effects of heat. We must not, however, suppose that heat is always accompanied by light, or light by heat. The electric hump turnishes us with a very brilliant light have both the luminous and the coleption mys in a begun from it. If now we cause this beam to pass through a glass trough Illied with a solution of aluny.

the luminous rays will mass on as before, but all or nearly all of the heat will be intercepted. The alum solution serves, in fact, as a filter to remove the thermal rays. Now remove the glass trough, and substitute for it a slab of rock-salt thickly covered with lamp-black, so that no light can penetrate it, On placing a differential thermometer, or thermoelectric pile, in the place where the luminous rays had previously been brought to a focus, we shall find that nearly all the heat has passed through the rock-salt, though the luminous rays have been intercepted. By suitable arrangements we may actually succeed in igniting various substances by means of this non-luminous heat. We see thus that the luminous and the heat-giving rays may be entirely separated from one another.

MECHANICAL EFFECTS OF HEAT-THE MECHANICAL EQUIVALENT.

We have now to notice the mechanical effects of heat, and to learn how it may be converted into work. To ascertain the mechanical equivalent of

heat—that is, the amount of work that can be accomplished by a given quantity of heat—is a difficult problem. It has, however, been solved, mainly by the patient researches of Drs. Joule and Micyer. The following experiments will give an idea of the process adopted by the latter:—

the latter:—

Let An (Fig. 20) be a tube closed at its lower end, having a sectional zero of one square inch; and let c be a piston fitting it sit-sight, and capable of moving up and down without friction. Also let c be supposed to weigh 15 lb. 12 oz., and to be 493 inches from the bottom, the air below being at the freezing-point.

Now rather the temperature of the air 1" Fz, and since the coefficient of expansions of the pixture of the

he 465 troine from the bottom; and thus, the covery degree the emperature is raised, the piston will rise an additional incb. If then, the temperature is raised, the produce of a first will be doubted. In this case work has been done by the heat, and that work has consisted in raising the piston and the air above it, which together press and the contract of the co

Now try the experiment in a different way, and ascertain the additional weight requisite to keep the piston in its place, while the temperature varies. We shall find that if the temperature is raised 1°F., one conce must be added to the piston to keep it stationary: if 2°F. two concess and so on. Heroe.

if the temperature be missel 40°2 °F., 49°2 or, must be placed on the piston to keep the volume the same. Compare now these two experiments. In one case we have raised the temperature, keeping the pressure constant while the volume increased; in the other case the volume has been kept constant. The same amount of air has been missed in each case to the same temperature; but a different quantity of heat has been required; for investigation shows that if 10 grafus of any combastible material are required when the relaxe is kept constant, 14°2 grains of the constant of t

Now suppose we have a vessel two feet deep with a movable piston one square foot in area and half-way down the yessel, so that there is just one cubic foot of air in the vessel. The temperature is raised 492° F., so that the air will occupy double the space; and as the pressure on the surface of the piston is 144×15 lb.=2.160 lb., it will have lifted this weight one foot, or, in other words, performed work amounting to 2.160 foot-pounds. The weight of the cubic foot of air is 1.29 oz., and as will be explained shortly, the amount of heat required to raise this to any temperature would only raise 0-31 oz. of water to the same temperature, the air having less capacity than the water. The total amount of heat, then, which has been received by the air is sufficient to raise 0.31 oz. of water 492° F., which is the same as raising 9% lb. 1°F. Of this amount, is, as explained above, employed in driving back the air, while the rest serves to raise the temperature. Now, 1421 of 91 lb. is about 28 lb., and thus we find that the amount of heat required to raise 2.8 lb. of water 1° F. is sufficient to elevate .2,160 lb. to a height of 1 foot. Dividing 2,160 by 28, we get a quotient of 772 nearly, that is, the quantity of heat required to raise a pound of water 1° F. will perform work equivalent to 772 footpounds. As, however, the thermal unit is usually taken as the quantity required to raise a pound of water 1° in the Centigrade scale, the equivalent must be increased by 4 and will be found to be 1.390 foot-pounds.

By a number of different experiments, conducted with great cape and patience, Dr. Youle arrived as very similar result, and we may therefore affely take this as the true equivalent. The amount seems very large, especially when we consider the great amount of heat produced by the combated of various substances. A pound of charcoal, for instance, by its combastion produces 8,000 miles affect of best, and this generates a force sufficient to rules a weight of many 5,000 tents on height of one on height of one of the contract of the contrac

We do not wonder, since this is the case, that means should have been sought of utilising the heat of the sun's rays, which, on a bright summer day, are calculated to impart about 5 thermal units per minute to each square foot of surface, placed so as to receive them perpendioniarly. No important practical results have, however, been obtained at present from these attempts, though several inventors have claimed for their machines the power of turning this force to good account. It is, howover, senreely probable that, in an economical point of view, they would be able to compete with coal and other urticles of fuel.

CONVERSION OF HEAT INTO WORK.

· Illustrations of the conversion of heat into metive power, as described in our last lesson, are frequently et with. One of the best of these is uffer the steam-engine. If we enter any large fuetery where steam power is employed, we find different machines at work. In one place, it may be, beavy weights are being raised or moved : in another, lurge pieces of metal are being turned or cut into shape, or other operations being carried on with apparent case by the aid of machinery. For all this a con-siderable amount of force is evidently required, and the question nrises, Whence does all this force come? The runchines, we know, cannot create it; it is ovident, therefore, that the source of it must be sought for in the heat produced by the combustion

of the fuel in the furunce If the supply of fuel be diminished, and cer quently u smaller quantity of heat be produced, less work will be necomplished; and if we could in any way ascertain exactly the amount of heat carried awny by the het air up the chimney, and that lost by radiation and conduction, and dissipated in other ways, we should find that there was still a portion of that produced by the combustion of the fuel left accounted for; this balance would be exactly proportional to the amount of work that find be emed. Allowance must, of course, he made in this calculation for the force required to impart motion to the machinery itself.

A portion of the force thus produced is often re-converted into hent. If we stand by a drillingnunchine, or lathe, in which a piece of iron is bein shaped, we shall find that the turnings or borings are frequently too hot to be touched with any degree of comfort, although the mass of metal and the tool were both quite cold. The motion of the machinery is here partially transferred into one of motion of the particles of the iron, which manifests itself in the form of beat. In this way we learn that heat, like matter, cannot be destroyed, but only converted into other medes of motion.

SPECIFIC DEAT.

In our first lesson we selected as our thermul unit the quantity of heat requisite to raise a pound of water 1" in the Centigrade scale. Now, we should at first suppose that the same amount of hent would mise the temperature of a pound of any other substance to the same extent. Experiment, bowever, the philesopher's graud resort, soon shows us that

Let us provide three sources of heat of equal intensityor, better still, nn oil or water hath, capable of holding three large heaker glasses. Equal weights of water, oil of turpentine, and sulphurio neid should now be put in these, and a thermometer should likewise be placed in each heaker. Now piply a powerful source of heat, such as a Buncon's gas-burner, and watch the thermometers. The heat applied to each vessel is, of course, the same, but the thermometer in the sulphurio neid will soon be seen to be rising more rapidly than the others, that in the turpentine comes next, while that in the water is lowest of all. If we new further observe the time taken by each to attain any given temperature, ns, for instanco, 200° F., we shall learn . that the water takes nearly times times as long ns the acid, and more than twice as long'ns the

Now in each minute each must receive the same quantity of heat; it is oleur, then, that different nmounts of heat are required to raise the same weights of different sabstances to the same temperature. This fact, which is a very important one, is usually accounted for by saying that different bodles have different especifies for heat, or, as it is ore commonly expressed, different sussitio heats.

Another experiment, which the student may easily repeat, will render this much more elegr. number of balls composed of various substances such as lead, copper iron, tin, hismuth, and glass (Fig. 21). Immerse them all for a short time in he oll of a known temperature, or in

some other way hring them all to one temperature, and then place them u little distunce apart on a sheet of wax about half an inch thick. The balls will melt the wax at very different rates. If their temperature is high at first, the glass will soon melt through the wax, and fall; the iron and copper likewise sink rapidly, and lu a short time they too will through it, the iron being a little

in advance of the copper. The tin ball con and may just be able to be seen underneath, while the lead and bismuth sink but a little way, and , HEAT. 211

there remain: though they had the same temperaure as the rest, the amount of beat they possessed was only sufficient to melt a very small portion of the wax.

This experience suggests to in a moile of assectioning the specific base of different bottle which to be such that the sum of the su



Fig. 22. Fig. 23.

From this the specific heat may be calculated, and in this way a table can be drawn up, showing the specific heats of different substantian. Water is always taken as the standard, and the

specific baset of other hecities conjugeed with that of an equal weight of this substance. This is partly done as a matter of conveyience; in is found, however, as a matter of conveyience; in is found, however, of any other substance. The fact is an important one in the welfaire of the globe. The case, as it would known, always tende to preserve a mallored temperature of the two of the globe. The case, as it would known, always tende to preserve a more than the contract of
heat when the temperature is bigh, and giving it out again as it falls.

As it is often difficult to procure a lump of ice large enough to use in the mode described ve, the apparatus represented in Fig. 22 was devised and used by Lavoisier and Laplace in their investigations on specific heat. It consists of three trio metal vessels fitted with covers as may be seen more clearly by the sectional view (Fig. 23). The substance, M, to be tested is weighed, and its temperature ascertained; it is then placed in the inner vessel, the spaces between that and the next, and also between the middle and outer vessels being filled with pounded ice. The outer layer provents any heat from without reaching the middle vessel, and the water produced from this issues by the tap E. A separate tap, D, carries off the water melted by the heat of ar; this is received in a glass, and measured or weighed, and shows the amount of beat given off by the substance in cooling. The main drawback to this apparatus arises from the fact that some of the water remains among the interstices of the ice, and therefore the amount received in the glass is somewhat less than that actually melted. If M weigh exactly a pound, and it be raised to the temperature 142° F., the specific heat is at once known by learning what portion of a pound of water is melted. A quarter of a ponad in the vessel would indicate a specific heat of 0.25, and so on. When the substance has a different weight, or is raised to a different temperature, allowance must be made by a sum in proportion

There is another way in which the differences in the specific heats of various substances may be shown and ascertained; this is known as the method of mixtures. If we take a pound of water at 100° F., and another at 150° F., and mix them, the temperature of the mixture will be the mean of the two, or If however, instead of the pound of water at 150° F., we take a pound of mercury at the same temperature, the temperature of the mixture will only be about 102° F., showing how much less heat was contained in the mercury than in the water. The mercury has lost 48° F., while the water has only gained 2° F., and yet we know that whatever out of heat the one has lost, the other must have gained. The mode of ascertaining the specific heat of any sabstance in this way is comparatively simple. Suppose, for instance, we have a piece of copper weighing fifty ounces; it is brought to a temperature of 200° F., and maintained at that for a short time, so that every part may be equally heated. It is then immersed in 100 ounces of v at a temperature of 60° F., and after it has had time to share its heat with the water, which is gently stirred to aid this, the temperature of the whole is

The water here has gained 100 found to be 603 found to be out. The water set of $666 \pm 600 \equiv 650^\circ$ F, while the copper has lost $50 (200 \pm 66 \pm 0) \equiv 6675^\circ$ F, and hence its specific heat is was, or 0.096. The specific heat of liquids may also be learnt by noting the time they take to cool from a high temperature, as those which gain heat most rapidly lose it likewise most rapidly. The small specific heat of mercury—it being only about 10th that of water—renders it specially

suitable for filling thermometers, since it rapidly acquires the temperature of any liquid in which it is immersed, and does so, too, without greatly lowering its temperature. The annexed table gives the specific heats of a few of the more common

DULONG AND PETIT'S LAW.

Now, in the above table no relation whatever is visible between the different numbers; but if, instead of taking equal weights, we take the substances in the proportion of their molecular and atomic weights, we shall find a simple law. To check this, let us multiply the numbers placed above agains the elementary bodies by the atomic weights of those bodies. Thus:-



This product is the atomic heat of the metal. Similarly, if we take the molecular weights of compounds and multiply by their specific heats, we get a product which is equal to the sum of the atomic beats of their constatuents. Thus :--

Molecular Specific weight, heat Silver Chloride, ArCl 1435 × 6 009 = 2 × 6 4

It will be seen now that there is evidently ro bidden link of connection between chemical composition and specific beat.

CONDUCTION OF HEAT. It now remains for us to inquire into the ways in

which heat may be communicated from one body to another, and these may be classed under three different heads—conduction, convection, and radiation. The former of these is most common, and must be spoken of first. If we take a rod of glass, and another of iron, and place one end of each in the flame of a spirit-lamp, these ends will soon become red-bot. After remaining so a few mir the iron rod will be too hot to be touched within a considerable distance of the hot end, whereas the glass rod may be handled with impunity almost up to the heated part. In the case of the iron the motion of the molecules is transferred from one to



Pro. 04

er till, in a little time, the whole rod bec hot; the glass rod, on the other hand, does not transmit these vibrations with the same facility, and hence it is called a bad conductor.

The apparatus shown in Fig. 24 illustrates the difference in the conducting powers of various bodies. A metallio trongb has a number of boles made along one cide. These are closed by oorks, through which rods of various substances—as wood.



ss, and metal—are passed. Melted wax or tallow is now emeared on the rods, and allowed to cool, and the trough is then filled with boiling water The rate at which the heat is conducted along the different rods is at once seen by observing the distances to which the wax is melted along them. Fig. 25 sbows a more elaborate plan of ascertaining

enducting power. A har of the metal to be tested his cavities made along it at regular distances of three or four inches. Mercury is now poured into these, and a delicate thermometer is put in each. Heat is then applied at one end, and the rate at which it travels along is shown by observing the

readings of the different thermometers. Other experimenters have done away with the cavities, and employed a flat bar, te-ting the temperature at different parts by means of a thermo-electric pile. It is found in this way that the conducting power of different metals varies very greatly, that of silver. which is the greatest, being expressed by 100, while that of German silver is only 6. One important fact which strikes us here is that their conducting power for electricity seems to correspond closely with that for heat.

We shall now understand the reason why metals and other bodies feel cold to the touch. They are good conductors, and therefore carry away rapidly the heat from the part of the body with which they are in contact; bad conductors, on the other hand, only rob us of a small amount. As a general rule, all organic substances, and those which are loose



In texture, are bad conductors; hence these are selected as the materials for our clothing. A great mistake is often made in supposing that clothing actually imparts heat; the real fact is, that it merely keeps in the heat which is produced in the system. The human body is considerably above the surrounding air in temperature, viz., at 98.40 F., being kept so by that portion of our food which is burnt in the system. This heat would be very rapidly dissipated, and imported to the air and surrounding objects, did not our garments intervene and, by their non-conducting power, prevent its escape. A further illustration that this is really the case is seen in the fact that ice carts are carefully covered over with blankets, certainly not with the intention of keeping the ice warm, but for the sake of keeping out the warmth of the air, which would rapidly melt it.

Air is a bad conductor; hence loose bodies, such as sawdust, shavings, or tow, which enclose a large amount of air in their interstices, are frequently employed to exclude cold. Water, likewise, is a very bad conductor. This at first seems unlikely. when we remember how onickly a quantity of water may be brought to the boiling point : but we shall soon see that this is not heated by conduction, but by convection. To prove this, we may take a large jar of water, and, having placed a deheate thermometer at the bottom, set light to a tin saucer of spirit floating on the top. A large amount of heat will thus be produced, and the saucer will soon become intensely hot; the thermometer at the bottom, however, will remain unaffected for a long time. A simpler way of proving this fact is shown in Fig. 26. A test-tube is filled with icc-cold water. some fragments of ice being kept at the bottom. A spirit-lamp may then be applied to the noper part, and the water there will boil for a long time before the ice at the bottom is melted. This would not be the case if the water could conduct the heat.

APPLIED MECHANICS.—XVII. [Continued from p. 150.]

CYLINDRIC. CONICAL, AND FLAT SPIRAL SPRINGS-RESILIENCE OF A SPRING-CENTRIPETAL AC-CELERATION AND CENTRIFUGAL FORCE-APPLI-CATION OF CENTRIFUGAL FORCE-HARMONIC

In these the last lessons of the series it will be necessary to refer briefly to various matters which have been left over until now, and which are so important that they must not be omitted, even at the risk of making the lessons of a somewhat disjointed and miscellaneous character. The strength and stiffness of springs used in various machines and appliances is of great importance, and opens up a very wide and important subject, but we shall refer only very briefly to those kinds of springs in most general use. Spiral springs may be said to consist of two classes: (1) those composed of wire which has been wound on a cylindric core or mandril, and (2) those in which the spirals follow a conical surface. The former are in common use, and known to everyone as "spiral springs", the latter are used for buffer springs and such purposes, and are generally called "volute" springs The commonest-and, perhaps, most useful-of all springs is the ordinary cylindric spiral spring of round or square wire. If such a spring is elongated, the wire is everywhere twisted; if the spring as a whole is twisted, the wire is bent.

Fig. 100 is a picture of such a spring; and in considering the forces acting on it we may neglect its own weight, which forms a force usually small in comparison with the others. Consider the forces acting at a section P (Fig. 101) of a spring of round wire. Byidently the molecular

forces at P must balance all the forces acting on the spring from that section to the lower end. The load w gives at P a twisting-moment = wr. together with a shearing force = w, which, however, may usually be neglected. Now, if the twisting-moment we note at P. how much will the whole length of wire above that point twist?

Our law for the torsion of shufts helps us here. We saw that the

I wist per inch of wire or shaft, due to a twisting - moment M,



d being the diameter of the were From this, it follows that the twist (in radians) in I inches of wire, due to the load w. wetter. * N. 6

#NdV

Now the connection between twist in wire and elongation tour si parret lo readily seen from the

following experiment. In Fig. 102 the spring U C and the wire A II ure composed of the same length of wire. and are taken off the same coal -are. in fact, similar in all respects, the mean diameter of the coils of the spring DE being the same as the mean diameter of the circle described by the cord cu, wound on the pulley

But, as already stated above.

n. It is found that when the spring is loaded with different weights, the pointer at G always descends trice as far as the pointer at P. showing that the length of cord let off the pulley n is equal to the

clangation of the spring. If e is the angle (in radians) through which the pulley it or the wire A it twists, the length of coud let off is 70, where r is the radius of that pulley;

hence,
$$r\theta$$
 is also the elongation of the spring D in
But, as already stated above,
 $\theta = \frac{2\pi M_0^2}{r_0 M_0^2}$, $r\theta = \frac{2\pi M_0 M_0^2}{r_0 M_0^2}$

or the clongation x of a cylindric spiral spring of

circular section, d inches in diameter-the length of wire in it being I inches, mean radius of coils r inches, modulus of rigidity N-due to a load of w pounds, is given by the rule-

$$x = \frac{32WIr^2}{\pi NeU}$$

This is the law of stiffness for such a spring.

With regard to its strength, it is generally necessary to know the greatest load it will bear without getting a "permanent set." This is obtained from the rule for the strength of shafts-

fa in this case being the shear stress corresponding to the elastic limit, and n = wr. Hence, the load required is-

This is the law for the strength of a spiral spring. It will be seen that this load is independent of the length of wire in the spring. We need scarcely add that a may be either elongation or shortening of the spring, according us the load is applied.

RESILIENCE OF A SPIRAL SPRING.

The amount of energy such a spring as we have been discussing will store without being hurt is a matter of great importance. It is evidently $\frac{W_d}{n} \times x_d$. where we and reate the load and changation correspopling to the clastic limit.

We have already seen that-

$$W_s = \frac{r_s \alpha_{ss}}{t \alpha r}$$



 $=\left(\frac{rel^2f_1}{\sqrt{c_0}}\right)^2 \times \frac{16}{\pi} \times \frac{r^2l}{\sqrt{c_0}} = \frac{rel^2}{\sqrt{c}} \cdot \frac{l}{\sqrt{c}}$ But "Al is the volume of wire in the spring: hence.

Resilience =
$$\frac{\mathbf{r}}{I} \times \frac{f_0^{-1}}{\sqrt{I}}$$



or the resilance per cubic inch is-

fr? inch-poonds.

We have then the important result, that the amount of work a spring will store is simply proportional to the release of stuff in it; and it does not make any difference, as regards resilience. whether the stuff is in the shape of a long thin or short thick wire. A similar result was obtained for a bar in ten-ion.

In the for-going we have assumed that the angle which the spirel makes with a plane normal to the axis of the spring is zero. In most springs it is small. The theory of the stiffness of spiral springs, taking the magnitude of this angle and the different shapes which a right section of the stuff may have into necount, is somewhat complicated. We cannot go fully into the matter here, but shall merely indicate the practical result of the investigation as far as regards a few of the commoner sections used in such springs. If the section is a circle, and the angle of coiling nearly zero (as in the case we have just taken up), there is no tendency for the ends of the spring to rotate; but if the section is not circular, there is such a tendeucy, especially if the angle is considerable-the rotation for a given axial deflection increasing as the section departs more and more from the elecular share.

The following is a useful general rule for the axial deflection. r, of a cylindric spiral spring acted on by an axial force w --

$$z = Wir^2 \left(\frac{\cos^2 \alpha}{4} + \frac{\sin^2 \alpha}{2} \right),$$

where a is the angle of the spiral measured as referred to above : A and B being constants expressing respectively the torsional and flexural rigidities of the wire of which the spring is composed, Values of A and B for a few sections are given below, N and E having the meanings already assigned to them :-

Shepe of Section.	Value of A	Value of B
Circle.	±Nd+ 82,	π <u>Ε</u> Ι ⁴ .
Ellipse, diameters D and d Lisjordiemeter parallel to axis of spans.	$\frac{\pi N D^3 d^3}{10 (D^2 + d^2)}$	<u>πEDeP</u>
Square, side S.	14058287	ES*
Rectangle; breath b, thick- ness t, side b parallel to axis.	$= \frac{2}{2} \times R^{3}$ if t is very companied with the property of the property	Eb0

The commonest section, as at to the circular, is the square; and if the cons are year flat, so that a may be taken as zero-

$$r = \frac{WI:}{24000000}$$

If the augle a is 45°, the rale becomes-

$$r = \frac{Wir^2}{\sqrt{N}} (\frac{7^{-1}}{N} + \frac{12}{N}).$$

If E be taken as 21 times X, the rule samplifies to --

$$x = \frac{6.78W L^3}{NS^4}$$
, or approximately $\frac{6W L^2}{NS^4}$,

whereas if—
$$a = 0, x = \frac{7 \cdot 1 \cdot W / r^2}{5 \cdot 3 \cdot 1};$$

in other words, whilst the rotation of the ends is greater, the deflection, when the angle is 45°, is only ? of what it would be if the angle were 0. The maximum stress to which the stuff is subjected by the application of a load w, is, according to the authority quoted below-

Making this the proof-stress, we can find the greatest

load which should be put upon the spring. If the spring is composed of a broad thin strip the rotation is great for a snull axial motion, and Professors Ayrton and Perry ase this form of section in their electrical and other measuring instruments, where a small extension of the spring produces a considerable rotation of a pointer attached to it. For the deflection of a volute spring. such as that shown in Fig.



Fig. 103.

103, due to a given load w, if the stuff is uniform and rectangular in section, the following rule is given by Mr. Young in a paper read at the Institution of Civil Engineers :-- *

$$x = \frac{3\pi W}{2\lambda N M^3} (R_B^4 - R_0^4),$$

where h and i are the breadth and thickness of the section, A is the increment of radius per coil, B., and Ra being the greatest and least radii of the spiral respectively, and x the required deflection. If the strip varies in thickness, the mean value of t may be taken. If A = t, so that the coils just fit (it is usually a little greater to allow for clearance) the rule cridently is $z = \frac{3\pi W}{2NL^{12}} (R_n^4 - R_g^4)$

$$z = \frac{3\pi W}{2N\delta \vec{r}} (R_n^4 - R_o^4).$$

"Minutes of Proceedings of the Institution of Civil . Engineers," Vol. CI., page 265.

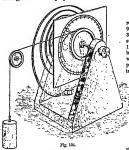
The greatest load the spring will bear without getting a permanent set is obtained from the rule-

$$W = \frac{\partial t^2 f_*}{\partial t^2}$$

where f, is the proof or clustic shear stress of the wire or strip of which the spring is made.

The student who wishes to obtain further information on this interesting subject should consult the article quoted.

A flat spiral spring, such as the mainspring of a watch, is everywhere bent, the bending increasing as the spring is wound up. Such a spring does not exert'a constant unwinding moment; but this variableness of unwinding tendency may be climbistacle or diminished by the introduction of a fuse as in English wotches, or by the use of n very long spring and n poculiar method of fasterning the ends, us in n° going-barrell "westbess. If you make an experiment with negling which is rather short, the colleof which me circular and concentric with the axis of turnine, and which is rightly fixed to the arriver and



frame at the ends, you will find that the mwinding complete nearly proportional to the angel or winding-up, also proportional to the quantity $\frac{g_0 d_0}{12}$ (called n on previous page), and Inversely proportional to the length of the spring. It is interesting to note the change in the law produced by allowing the ends a certain amount of freedom relative to the arbour. Fig. 104 shows an arrangement which may be adopted, but the writer is in the habit of applying.

two equal opposite and parallel forces, i.e., a true couple, to the spring. The angle of winding and the couple balancing the unwinding tendency of the spring should be plotted on squared paper. The time of vibration of such a spring is of some importance.

The practical application of these various rules can only be properly understood by working numerical examples, and hence the student should go carefully through those which follow.

NUMERICAL EXAMPLES.

1. A cylindric spiral spring of round whe is regarded, which is to aborden half an inch for a local of 100 lb. If the mean dinucter of the coils is 8 tiches, and the number of coils 10, find the diameter of the wire, a being 13,000,000. If f, is 0,000,000 in the coils 10,000 in the

Answers. Diameter of wire = 426 inch. Grentest safe load = 1019 lb. Resilience = 216 ft.-lb.

2. A cylindrical spiral spring of square wire is required, which is to shorten 1 inche under a lead of 900 lb. If there are 9 colts in the gring which is 3 lunkes in mean diameter, find the section of the stuff, the magle of colling being very small. x = 120,00,000. Thing the same proced-stress as in the last example, find the grentest load which the spring will bear without permanent sets. Find also the proper size of section if the angle of colling is 40°, in which case the length of wives is √2 times as

great as before. E=36000000.

Answers. Side of square = 57 inch.

Maximum load == 25776 bb.
If angle of colling is 46°, ss= 58 inolu.
3. A spring similar to the last is required, the coils of which are to close right up with a load of 2,000 bb. If the space between two successive coils, when the spring is unloaded, is equal to the side of the section of the wire, find the proper size of section.

Answer, s= 49 inch.

In a volute buffer spring, the breadth of the strip of which it is composed is 46 inches, mean thickness 3 inch, maximum and minimum util of the coits, which are supposed just to fit, 24 and 14 inches respectively. Taking x = 13,00,000 and ∠ (the shear stress of permanent say) and the coits of
Answers. Deflection = 1 865 inches.

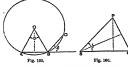
Maximum load = 5192 3 lb.

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CENTRIPETAL ACCELERATION AND CENTRIFUGAL FORCE.

If I attach a cord to a bull and, holding the former in my hand, whirt the ball round my head in a circle, I am convictous that the ball exerts a pull on my hand by means of the string. We have in this a practical illustration of Newton's law, that a body tends to move on in a straight lime except when acted on by a force, and if the body is compelled by the force I sear through the string to follow a circular string to the string to follow a string the string to the string

Let us study the change of velocity—in this case change in direction of the motion—or acceleration due to the inward-acting or "centripetal" force. Instead of moving with a regularly changing direction, let the body move along the sides of a polycop, as A D in Fig. 105, moving along a B with



a uniform velocity, then suddenly changing its direction of motion to BC. Let 8 q and 8 F (Fig. 106) represent the uniform velocity along AB and BC; then PQ will represent the acceleration or change of velocity at the point B.

But in Figs. 105 and 106 it is easily seen that the triangles P S Q and A O B are similar, hence $\frac{PQ}{R}$

$$\frac{A B}{A O}$$
, or alternately, $\frac{P Q}{A B} = \frac{S Q}{A O}$.

But since PQ is the centripetal acceleration a, and

But since PQ is the centripetal acceleration a, a A B is the uniform velocity v;

$$\frac{PQ}{AB} = \frac{SQ}{AU} \text{ may be written},$$

$$\frac{\alpha}{v} = \frac{v}{\tau},$$

or--

We have then the important result, that the centripetal acceleration of the particle or body considered is the square of its relocity divided by the radius of its radh. Let the number of sides in the polygon be indefinitely increased, and we have in the limit the polygon agreeing with the circle and the body moving with a regularly changing velocity on the circle. Hence the centripetal acceleration of a body, moving uniformly in a circular path, is $\frac{\sigma^2}{r}$. But

force = mass × acceleration; hence, if m is the body's mass, centripetal force = \frac{m^2}{r^2}\text{ What is called the centrifugal force, exerted by the body itself, is equal and opposite to this, being directed radially estimated, but in amount also equal to \frac{m^2}{r^2}\text{ the conductive force the conductive of the conductive force of the conductive for

 $\frac{mr^2}{r}$. If ω is the angular velocity in radians per second, since $r = \omega r$, the centrifugal force is $m \omega^2 r$. Engineers sometimes prefer this in terms of number of revolutions per minute. Let n be this number and W the body's weight in pounds.

or-

hence—
Centrifugal force = $ia \left(\frac{2\pi n}{ds}\right)^2 r = \frac{4\pi^2}{5\pi d0} \times \frac{W}{6\pi^3} \times rn^2$

Centrafugal force = $\frac{W_{TH}^2}{v_{0000}}$,

which is a very convenient expression for use in practical questions.

If must be remembered that the madius of the body's path is expressed in feet; the centrifugal force will then be in pounds. The student should also carefully observe that the centrifugal force is not a force acting as the revolving ball or body, but is equal and opposite to the centrifugal force is not a force acting on it, and is in fact a force exerted by the ball itself. The want of accouracy shown by some in this respect has led a few ultra-eclantific people to object to the accellent and convenient expression. On the contract of t

SYLLOGISMS: THEIR STRUCTURE, ETC.

HAYING now defined a Syllogism, and mentioned some of the most common erroneous tews about syllogistic reasoning, we have next to examine somewhat more closely into its structure, and into the different rules which have been framed to ensure the correctness of all reasoning which is reducible to this form.

At the root of the syllogistic theory lies the fact that every Conclusion is in reality deduced or derived from two other Propositions, called Premises. i.e., propositions premised. Many persons have been led to deny this, because both the premises are not always expressed, one of them indeed being commonly omitted; but in every case it will be found that the admission of the second or suppressed premise is essential to the validity of the conclusion as an inference. This will appear evident from supposing the truth of the suppressed premise to be dexied, when h will be found that we have no sufficient grounds to warrant our inferring the truth of the conclusion. If, for example, anyone asserts that from the single premise, "the world exhibits marks of design," he can draw the conclusion that "the world must have had an intelligent author," his error will be seen if an opponent devies that "whatever exhibits marks of design must have had an intelligent author." This will at once make it evident that it is not from one premise plone that the conclusion is inferred, but from two in combination, whether they are both expressed or not. Any other example of syllogism which might be taken would conally illustrate this. Where, as above, one of the premises is suppressed, the ureament is called by logicians on Enthumene, though this is not the correct use of the term.

When a syllogism is stated in correct legleal form, the premises are placed first, and the conclusion last; the latter below in all cases that which is to be proved, and the former that by means of which this is proved.

There are several kinds of syllogisms, differing in the kinds of propositions of which they are composed; but we are at pre-ent speaking only of the Categorical Syllogism, all three propositions of which are pure enterpricals.

Let us take a syllogism of this sort, and examine and analyse it : e.g.—

All non are mortals; bocrates is a man; Trenfore, Surrates is mortal.

Now, upon reflection it will appear erident, in the first place, that the wildily of the argument in such it case does not at all depend upon the trath of the premises. Either or both of these might be false or absurd, and yet the argument be quite sound, e.e. the countsion follows from them, so that if they error true, it would be true abe, and so that if would be mapes-bib for anyone to denythe trath of the conclusion, and yet admit that both of the premises were true. "All ime are stonicy; this bird is a man; therefore, if in stone," is a phopion countly corresponding to the one above riven, and its reasoning is perfectly correct. The conclusion follows necessarily from the premises, and when once they are admitted, the conclusion must be admitted also, as necessarily following therefrom, and this although both the promises are really false.

Hence, of cearse, it is not even necessary, in order that we should be able to determine upon the validity of a syllegism, that we should understand fully the searing of the terms of visibility is propositions are made up; so that we can just as well represent such a syllegism as the above by nears of symbols without any fixed meaning, "all Y is $X_i = X_i + X_i$

The rule for testing the validity of syllogisms. laid down by Aristotle (and called the Dictum de owni et nulle), is this :- "Whatever is predicated (i.c., uffirmed or denied) universally of a term (in other words, of a term distributed), whether affirmutively or negatively, may be predicated in like manner (i.e., affirmed or denied) of overvibing contained under it." Thus, in the examples we have taken, "mortal" (X) is affirmed universally of the term "men" (Y), i.e., of this term distributed, mul "Socrates" (Z) is contained under "men" (Y); therefore "mortal" (X) may be affirmed of "Socrates" (Z), This rule may be applied immedintely or ultimately (ns we shall afterwards see) to all arguments; and none can be valid which cannot be proved to be in conformity with it. The whole keystone of reasoning, as explained by Logic, is this very simple principle, so simple that upon that very ground it has been seorned and ridiented by many. The dictum is not, as some suppose, intended to prove that a syllogism is conclusive in its inference, but only to account for the fact, that any arenment which happens to be capable of being thrown into the form of a correct syllogism is valid, while no argument can be valid which cannot be thus dealt with. If we attempt to reduce an invalid argument in a regular syllogism, we must, it is true, fail; but then the more nearly it is made to approach in form to the syllogistic, the more case of detection will be its fallacy the more clearly we shall be able to perceive that it violates some requirement of the dietum above given.

There are certain general rules applicable to all syllogisms slike, which are founded on these two cauous.—Frest, Terms which agree with one another; the same third term agree with one another; Serond, Tenus, one of which agrees and the other disagrees with one and the same third term, disagree with one another. There are too a volter-disable to many the control of the control o

amongst the rations of Geometry. The principal of the general roles deduced from them or those:— 1. In every syllogism there are three teams, and classon, in where there are two-terms copy (smallly called activese), and unless these are both (one in each of the two premises) compared with one and

called activated), and unless these are both (see in one) of the two precisions) compared with one and the anne third term, they ename to proved either to array or disegree with one smoother. The predictor of the conclusion is called the Major term; its subject, the Major term; and the third term, with which they are each segmentary, compared, is called the Major term.

the Middle.

2. In every syllogism there are three propositious, and three, only, viz.:—I, the Major Prewise (in which the major term is compared with the middle); 2, the Misor Prewise (in which the milor term is

compared with the middlo); and 3, the Conclusion (in which the minor term is compared with the nunjor).

3. The middle term must not be ambiguous; for

in this case, shithough there may be only one middle to me in sound, there will be two in seen, and the seem in sound, there will be two in seen, and the seem in sound, there will be two in seem, and the seem in the seem of the third preserved the one of the third preserved the one of the third preserved the one of the two pressures, or from its being undistributed to two pressures, or from its being undistributed trease may have been compared tool with a seem of the two pressures, or from its being undistributed trease may have been compared tool with a seem of the seem of t

prediction to distributions of the move of

term; for it would be to compare a part only of the extreme with the middle, and then so compare the schole of it in the conclusion with the other extreme: e.g., "All men are mortally ishes ore not men; e.g., "the men are mortally ishes ore not men; term, thought undistributed in its premise, is distract, thought undistributed in its premise, is distributed in the conclusion, and the argument, therefore, is humid. This is an example of what is called an "allied process of the Allow" occurring where the same fault occurs with neapest to the Miner term.

c. From two negative precesses necking can be inferred. This is obvious; for the middle is then a term with which cach extreme disagrees, and not one with which one extreme agrees and the other disagrees: 24, "Men are not stones; Men are not angels," is a combination of propositions which does not warrant any conclusion at rill.

6. If one of the prunies be negative, for conclusion will be negative. For the remaining promise is affirmative (by Rule 8); therefore, one of the extremes agree with the middle term, and the other disagrees with it; and therefore the extreme disagree with one another, i.e., the conclusion is negative. It can also be shown, in a similar munnor, that one of the premises must be negative it the

conclusion is negative,

1. If both pressures are particular, nothing can
be affirmative (by Rais B); and in it, therefore
be affirmative (by Rais B); and in it, therefore
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would result a violation of Rule 4.

8. If one of the premises is particular, the conclusion will be particular. It will easily appear on examination that, the violation of this tule would, in every case where the premises are otherwise correct, havelve an "filled process of the minor," in fault we have already explained.

The last two rules are sometimes strated together

in this form: the conclusion follows the weaker part—the negative being regarded as weeker than the afficiantive, and the particular than the universal.

We have next to see in how many different ways three propositions can be combined so as to make a

regular and valid syllogism.

The determination or designation of the three propositions of a ruligoism in this role, seconding to their quantity and quality, is called its June. Now, as there are not hose braked propositions of such as the proposition of the proposition that the number of possible models is obvious that the number of possible models is obvious that the number of possible models in the proposition. This gives are not made to an again procules, each of which say in lite annater have four minors. This gives are not made to conclusions; so that there are allogather sixty form ways of combining the three propositions.

The majority of these, however, although arithmetically possible, are logically invalid, from violating some of the above rules. For instance, BEA is excluded for having two negative promises, and fifteen other combinations are hambes-side for the same reason. 11A and eleven others have two particular premises; twelve violate Rule 6; eight Rule 8; and four the latter part of Rule 6, having a negative conclusion with two affirmative normals.

By this means offly-even mode subgether are excluded, as each offending against one at least of chiedo, in small offending against one at least of the general rules. In sublition, one mood, 1 E. O. Jo immulatishie, as B always involve an "filled process of the major"; for the major term is distributed in the cauchision, which is negative, but subject or proticitate. There remain, therefore it is subject or proticitate, There remain, there is no in rightmust explication. There remain, there is no in rightmust explication. There remain, there is no light may be a subject of the A in A

The Papers of a syllocism is determined by the silication of the middle term with reference to the extremes in the two promises. Hence, there result four figures; insamela as the middle term any hather subject of both permises, or the predicate of both, or the subject of thir rand the predicate of the other. When the mobile is the subject of the major permise and the producte of the major permise and the product of the middle is the predicate of both practises; in the Tilot, the subject of both; and is the Papers, in the Tilot, are of the subject of both; and is the Papers, in the Tilot, and the subject of both; and is the Papers, in the Tilot, and the subject of both; and the Papers, in the Tilot, and the subject of both; and the Papers, in the Tilot, and the subject of both; and the Papers of the rather, and the subject of both; and the Papers of the color, and "a" the middle; we may wishfull the four figures that we want to be the production of the papers of the subject of the subject of both productions of the papers of the subject of the papers of the papers of the papers of the subject of the papers of the pap

Out of the eleven nodes cumarated above all are not admissible in covey favor. Thus A. 14, which is a scalinate in the first and third flaures, would have the middle mider-flavor did not seen and and Gorrth, and A. E. I. would have be might process of the maps α in the first, while it does not induce any rule in the second. By trying the different notation, we shall find as the result of the experimental control of the second of the experiment of the order of the experiment of the order of the experiment of the second of the experiment of the

Logicians have devised names for each of these nincleen moots to distinguish the figure in which it occurs, and also to serve other purposes we shall sub-equently uoint out. The three reachs in each name denote, by their quantity and quality, the three propositions of which the syllogism is comnowed. The names are there:

Fig. 1. Barbara, Cetar-nt, Durit, Perio.

Fig. 2. Cesare, Camestres, Pestine, Baroko

Fig. 3, Darapti, Felapton, Dissuits, Datisi, Bolando, Ferison, Fig. 4, Bramantic, Camenes, Dimeris, Fesaro, Presison,

From m examination of these different moods of each figure, we may perceive, amongst other things, that all four conclusions may be proved in the firstfigure (in which alone A ls capable of proof); that the second only proves negatives, and the third particulars; and that my conclusion except A may be established by the fourth figure. These peculiarities follow from the rules already given; thus, since by Ibile ii the middle must be once at least distributed, and that he the . second figure it is the predicate of both premises, one of them must be negative, and therefore the conclusion negative also. A little consideration will enable the reader to account for all other special rules of a like nature, e.g., that the industration is a must always be uffirmative in the first figure. This may be proved as follows:--- If the minor were negative, the conclusion would also be pegative (link 6), and the major affirmative (Rule 5); hence there would be an "illicit process of the tunjor term," it being in the first ligure the predicate of both the major premise and the conclusion. By a similar application of the general rules it can be shown that the minor premise is affirmative in the third figure also; that the major is universal in the tire and second, etc. etc.

We may take one mood as an example in each ligare of the meaning of the fame, "All Y is X (Far); all Z is Y (Fa); therefore, all Z is X (α_i); is an example of Rabetare "All X is Y, in Z is X; it therefore, no Z is X," of L in L is X, and M Y is X, if all Y is Z; therefore, some Z is X," of L is X," of L in L is and "All X is Y; so Y is Z; therefore, no Z is X,"

The four moods of the first figure are called quefree, because the disturn is directly and immediately applicable to them, and all the others imperfect, in the first the unjoy premise states that the major extreme is predicated of the middle taken distitudincity; and the minor, that the minor extitudincity is is contained under the middle; so that aimset the very words of the filterin can be directly unforting.

Now as all reasoning ultimately depends upon the possibility of the dietma being applied as a test of its validity, we must be able to bring all imper-fect moods into the form of some one of the moods of the first figure in order to apply this test. The process by which this is done is called Restaction, which is the changing of an imperfect mood into a perfect, so as to make the force and validity of the reasoning evident, which was not directly evident

reasoning evident, which was not directly orders before. This is of two kinds—betweits Reduction and Reduction as (or less properly per) impossibile. (1) Ostensive Reduction.— By this method we prove in the first figure (which we know to be correct, hecause we can apply the dictum to it directly) either the very same conclusion as that of the original Resistent (i.e., the imperfect) mood, or one which directly implies it. Let us take Darapiti as an example:-

All wits are decaded; All wits are admired; therefore, Boxes who are admired are dreaded.

This is reduced to Daris by converting the minor rise (per accidens):---

All wits are dresded; Some who are admired are wits; therefore, Rome who are simired are dreaded. . Here we have the asses conclusion in the reducend and reduce moods. Or, suppose we have Casses-

tres :--All X is Y; No Z is Y; We can reduce it { No Z is X; to Celerral, thus....} All X is Y; · No X is Z

This is done by simply conversing the minor and then transporing the premiers; mad we thought the original conclusion from the new one by converting to simply. And since by applying the test of the being correctly doubtend from the reverse to the being correctly doubtend from true premises, we know, by the hurse of conversion abresdy explained, then its simple converse, the old conclusion, is true, aite. Thus, in Ostensier Reduction our mode of prect is always to their directly that the conclusion.

proof is always to show directly that the conclusion of the reducered is true.

(2) In Reduction ad superstitle, however, we prove its truth indirectly by showing it caused be false. Let us illustrate this by an example. Sup-pose we are given in Bareks :—

All good rulers are loved by their subjects; Some absolute measurehe are not loved by their subjects; ... Some absolute measurehe are not good rulers. Now, if this conclusion be false, its contradictory

must be true (as we have seen before). This is, "all absolute measurelss ore good releas." If we, then, substitute this proposition for the minor of the original syllogism, and draw a new conclusive from

these two new premises, we have the following syllogism in Berbrey .--

All good rules: are level by their subjects; All absolute mountchs are good sulers; All absolute mountchs are level by their subjects.

This new conclusion is the contradictory of the original minor premise, and therefore must be false; original univer presents, and therefore mest be finise; for as the presentes are always granted to be true, it is only the validity of the conclusion asserted to the conclusion and the conclusion asserted to But the user conclusion having been correctly deduced from two promises in the first figure, the finishmood must be in the promiser. The major can-mot be the false one, because it is one of those originally ladd down as tree. Hence it is the noise which must be false, and therefore its contradictory must be true; and this is the original conclusion of

which we were seeking to prove the truth.

It was with a view to pointing out the manner in which the different moods are thus to be reduced. that their numes above given have been framed. The initial consonants, B, C, D, F, desote the mood of the first figure (Barbara, Celarent, Daril, or Ferio) to which the reduction is to be made; s and p signify that the proposition denoted by vowel immediately preceding is to he converted in rowel immediately precoding is to be converted in the process (e, simply, and p, per ancidens); we points out that the promises are to be transposed; and \(\hat{\chi}\), the sign of reduction and injustified, in-dicates that the proposition denoted by the rowel immediately before it is to be omitted, and the contradictory of the conclusions a-bestituted for it— \(\hat{\chi}\), therefore, occurs only in Barnès und Inchanda,

ose being the only moods to which this kind of reduction is usually applied.

BRITISH COMMERCE.-V. [Centinuel frebs p. 160.5 TOBACCO

As a revenue-yielding commodity this is one of the most important articles we import. The total amount gathered by the customs in 1890 was £19,955,167, and of this tobacco contributed nearly the half, or E3,396,517. The high duties borne by this useful weed may be realised from the fact that the 65,729,970 lb. imported in 1890, and of the declared value of £2,692,805, paid a gross duty of £9,012,815, or more than four times the value of the article itself. It is this henry impost that makes tobacco the chief article with which attempts at smuggling

are practised.
' Of all kinds of tobacca—manufactured, usmena-factured, cigars, and sauff—the total imports in

1897 were unmanufactured 80,299,285 lb., of the declared value of £2,351,272, and manufactured and snuff 4,601,024 lb., of the declared value of £1,721,163. The rate of duties levied on tobucco vary (1896) with the condition in which it comes over. On unmanufactured tobacco the rate is . 3s. 2d. per lb. when it contains 10 lb. or more of moisture in every 100 lb., and 3s, 6d, when the moisture is less than 10 lb. in every 100 lb. On cigars the duty is 5s, per lb; on cavendish or negro-head 4s, 6d, per lb.; on snnff with more than 13 lb, of moisture per cent. 3s, 9d. per lb., and with 13 lb, or less per cent. 4s, 6d, per lb. : and on other kinds of manufactured tobacco 4s, per 1b. These varied and heavy duties make the linndling of tobacco by the customs officials a matter of great importance and intricacy.

The tobacco-plant, which attains a height of

about six feet, is an annual, and the parts that enter into commerce are the leaves. After blooming, the plants are cut close to the ground and hung up on poles to dry. Thereafter the leaves are taken from the stems, sorted into different qualities, and made un into bundles preparatory to fermentation. To induce fermentation, the handles are sluply stacked together on the barn floor, a good deal of watchfulness being necessary to prevent overheating and to get every part uniformly treated. The bundles are next packed-in America usually in barrelshydraulic pre-sure being used in the packing. Sometimes the tobacco is further treated by the curer or grower with the view to "improving" it, though this is more frequently left to the mannfacturer. In this process numerous articles are applied, such as comac, lavender, thyme, rose-wood oil, eassin, clove, raisins, vanilla, saltpetre, benzoin, sassafras-wood, etc., and the object is to give the tobacco a particular flavour, to make it burn better, to make it milder, or to improve its colour.

The tobacco leaves as they reach us are very dry and brittle, and, consequently, the manufacturer first subjects them to moisture, otherwise the leaves would all break up in the handling. For this water alone is allowable in England; in other countries different sauces are employed. After the leaves are sufficiently damped, the mid-rib is stripped from them and the halves arranged in sorts-the largest and strongest being destined for entting and spinning, the best-shaped for the wrappers of clears. broken pieces for filling eigars, and the ribs themselves for grinding into snuff. In the case of tobacco destined to be made into bird's-eye, the mid-ribs are not taken from the leaves, and it is the presence of the chopped-up ribs that has given this kind of toloceo its name,

The ultimate forms that the tobaccos from

different countries are used in me, roughly speaking, cigens for all that comes from Havenan, and Martillet, "Vitaria day and the secondary problems, and the secondary that the secondary speaking the secondary through th

eignretters, mixtures, initiations, and substitutes.

Amongs dailuternals of tolones used in the
Amongs dailuternals of colones used in the

vision are said to be deted yearly in Timiragia and
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are also need on the Couthernt in the same way.

The leaves mentioned, also rinharts, doels, and

burdook leaves, are soaked in toloneco-water. In

America, town-upper, specially prepared and in
pregnated with the judes squeezed from toloneco
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PEPPER.

Pepper, a name given to various plants of the antural order *Piperacea*, occupies the chief place amongst spices in British Commerce. The quanility imported is very large, and comes to us chiefly from the British East Indies and from Java.

The chief peppers known to commerce are black and white. Both are obtained from the same plant, Piper nigrum ; the white being prepared from the ripe fruit, the black from the full-grown fruit but before it has renched maturity. Different methods of cultivating the plants, which are climbing shrubs, are adopted in different countries; and sometimes they are raised from seed, sometimes from cuttings. They begin to yield in the fourth or fifth year, and, if from seed, contline fraitful for from twelve to fourteen years, if from enttings, for seven years. The pepper from the latter method of raising is much superior in quality to that obtained from: plants grown direct from the seed, and the yield is greater. A single vine yields about 13 lb. to 2 lb. in a year, and an acre may be set out with 2,500 plants. Thus, each plant yielding 21b., the produce of an acre, at 4d. per 1b., would exceed £80, while the cost of raising 2,500 plants is said not to exceed £4.

There are two crops of papper collected scey year—the first in December and January, and the second in July and August. The bundes are picked off the vines by hand, and then rabbed or trampled upon to separate the berries from the stems. At this stage the berries are of a height red coloir of the size and appendince of our helly berries. They are next spread out on units and left for from two to three days to dry in the sam. This process.

makes the barries black and shrivels thum up, giving the pepper the appearance in which we see it. After this it is put into bage of 64 or 128 H. each, and sent into the market. Unground pepper comes over free from adulterants; in the ground state, however, though a penalty of 2100 is attached to its sophistication, it is often mixed with meal, and the second of the second of the second of the second ground, and the second of the second of the second of the ground of the second of the se

White pepper, as already remarked, is the produce of the same plant as the black pepper, the breise being allowed, however, to ripes in the former case. Sometimes it is prepared by removing the dark outer layer of the dried black pepper. More frequently, after being gathered and kept in the house for a faw days, it is subjected to washing and purising, whereby the stalks and poly are removed, leaving the white seeds, which are ready for the market on being died. Other poppers are cayenne, and long pepper, imported in entire sukes observed the subject of the product of the product of the subject of the product of t

For a considerable time, pepper was one of the most heavily taxed articles among our imports. Until 1823 the duty was as high as 2s, 6d, per lb, seven times its price. In 1826, the duty on pepper from British Possessions was reduced to 1s; in 1837, to 6d; and in 1866 it was repealed.

SPONGES.

Sponges, the dead skeleton of the organisms con-tituting the order Spongida, come into this country to a very large extent annually. Turkey is the largest contribute both in bulk and valey is the largest contribute of the bulk and valey largely, and smaller amounts also come from various other countries, including the United States, France, and Malta.

Commercially speaking, the term sponges applied to the elastic horny shelenos of certain animals inhabiting the sea. By far the finest quality of sponges are those that come from the Mediterranean sponges are those that come from the Mediterranean sponges are those that come from the Mediterranean sponges are the sponges are to be necessary to, or at least needful for the encoungement of sponges (its, is the presence of currents and a continued life, is the presence of currents and a continued they occur so nbundantly in archipelagoes and of coasts bordered by islands or long reafs.

In fishing for sponges different methods are adopted, according as they are in deep or shallow water. In shallow water, they may be hooked by harpoons and dragged from their attachments. In deeper water—say from 28 to 40 fubous—divers go down for them. and in water beyond this depth dredging is reserved to. In harp-coming the chief doctated is to see when the sponger sur through the troubled surface of the sea. and, to overcome this, of is used to make the sarface smooth. Sometimes a water-giass is employed instead—contained to the season of the season of the season of the long, with a pane of giess ent the foot and a fall long, with a pane of giess ent the season of the season of man to see electry for a depth of 30 fathons.

In diving for sponges when they are beyond the reach of the harpoon, the diver takes in his hand a triangular-shaped stone of about 25 lb. in weight with a hole in one corner to which a strong line is attached, whereby communication is maintained with those in the boat. Round his neck is a net to carry the sponges in. The duration of a dive is said to be about two minutes, and at the end of that time the diver pulls the cord and is drawn up -perhaps with a good haul in his net and perhaps with nothing. A good diver, in good condition, will make from eight to ten such descents in a day. The work, however, is severe, and, after working at great depths, the diver often swoons when brought to the top. The bonts from which these operations are carried on usually have a crew of eight. The proceeds of the fishing are divided into shares-three shares being allotted to divers for every two shares

In dredging for sponges the season of the year chosen along the west coast of Asia Minor is the winter, when the sea-weed and other entangling growths have been dislodged by storms from the bottom. The net is usually about a yard high and six yards wide, and is dragged along by a tow-line attached to a ship.

In preparing sponges for the market they are first exposed to the air, whereby the animal is killed. Immediately the signs of decomposition begin to appear, they are besten with sticke or trodden on in a stream of flowing water. This is to free the appear, they are besten with sticke or trodden on in a stream of flowing water. This is to free the often animal. They are then hung up in the air to dry, and, when completely dried, are packed up in bales. If packed before throughly dry, the sponges heat and suffer—the resulting affection being termed by the fishermen "clolerum." It is faul to the sponge unless it be detected in time, and then the bales have to be unpacked and the affected parts re-

Being sold by weight, sponges are frequently adulterated with sand. To improve their colour also, they are often bleached, which gives them a very light colour at the expense of their durability.

SUGAR

arrives here in various forms. Of refined sugar the total import in 1897 was 15,832,092 cwt., of the declared value of £9.728,772. This came as lumps and loaves and in other shapes, including candy, and mainly from Germany, France, and Hollandcountries that sent respectively 10,124,904 cwt., valued at £6,147,402; 3,166,625 cwt. at £1,919,744; and 1,738,478 cwt., at £1,160,264. Of unrefined sugar the total import was 13,552,227 cwt., of the declared value of £6,222,025, comprising unrefined beet-root, unrefined cane, and other sorts. The unrefined beetroot sugar has its origin in Continental countries, mainly Germany, France, Belgium, and Holland. From Germany came 4,383,928 cwt., valued at £1,920,556; from France 2,751,951 cwt., at £1.312.111; from Belgium 1,173,157 cwt. at £500,844; and from Holland 211,289 cwt. at £88,134. The leading countries sending us unrefined cane are: Java, 445,559 owt., valued at £218,229; British Guiana, British West Indies and British Hondaras, 1,056,609 owt., at £651,691; British East Indies, 571,252 owt., at £200,933; Peru, 847,659 cwt., at £425,661: Philippine Islands, 812,111 cwt., at £310,840; and Brazit, 324,987 cwt., at £143,082. In addition to the foregoing, we received 1,154,044 cwt, of the value of £247,260, of molasses, which were imported chiefly from the United States; and counting all the items we have a grand total of £16,198,157.

The sugar-cane is a tropical grass with a stem · about 2 inohes in diameter, and rising to the height of 15 feet. When ripe, the canes are cut down and removed in bundles to the mills to be crushed. The object of the crushing process is to express the juice. which is gathered into vessels and boiled, the canes themselves being used as fuel. About half a dozen pounds of this juice is reckoned to give a pound of raw sugar. After the juice has been boiled to tho consistency of syrup, it is removed into other vessels. where, as it cools, it is stirred until it granulates, It is then collected into large casks or hogsheads and drained, the drainings being what is called molasses, the material left in the casks being sugar in the condition in which it is known as muscovado. the moist or brown sugar that we are familiar with. To make this white, all that is required is to further drain it and subject it to a form of washing. This is called claying sugar, because olay is used in the process. Over the sugar, which is placed in pots perforated at the bottom, is placed a layer of clay ou which water is poured. The water oozes through the clay, trickles amongst the sugar, and in its progress washes away the molasses from the sugar crystals, leaving them white. The brown colour of what we call moist sugar is thus due to the presence of molasses. Loaf sugar is also a more refined form of muscovado. The latter is boiled, clarified with eggs or bullooks' blood and by filtration through unimal charcoal, then clayed in perforated conical moulds, from which, on being removed, it is dried, and is then ready for the market.

Beet-roots are well enough known in this country, and though not cultivated for the production of sugar, yet find their way to our tables in salads. The processes of converting their juice into sugar are in effect pretty much the same as in the case of the cane-separation of the juice and evaporation. Besides cane and beet sugars, others known to commerce, though less extensively, are: sugar from dates; sugar from honey, called also Californian because it is in California that the houey used for this purpose is produced; glucose, obtained mostly from starch and used chiefly in brewing; and saccharin, a product of coal-tar and two hundred times sweeter than cane sugar. Besides these there are a great many other kinds of sugar; for, like alcohol, sugar may be made from almost anything, though the plants that contain it in most profitable quantities are the sugar-cane and the white beet. The variety of its sources may be seen from the following remarks by Mr. P. L. Simmonds :-

following remarks by Mr. P. L. Simmonds:—
"The plants constaining sugar, far from being
confined to a single species, are extremely numerous
angen may be actived. The plants of the species
angen may be actived. In practice of the potents
from a vest number. If any form of lights, or
woody fibre—for instance, servated, (cleaned from
all foreign bodies, such as resin, extractive matter,
etc.)—be rubbed up in a little sulpium's oad, fatting
care that the action of the acid does not go; to the
extent of charring and if the said be afrewards abstracted by adding to the mixture an alitall or
some produced to all the species of the contraction of the species of the

"Hay, staw, leaves, shavings—in short any form of lipenous filter—imay be similarly converted; and although we do this but clumsily and inconveniently in our laboratories, being as we are but nature's journeymen, nature herself carries on these trans-' matisfors with the most wonderfil results, as we see in the ripening of fruits, where the hard woody texture gridually aroftens down into sweet and leadous pulp, as in the ripening of the pear, the greach the strawberr, and, it short, almost all fruits'

"Bracconot, some years since, pointed out the very remarkable fact that sawdust and linen could be converted into grape-sugar, and that from a pound of these substances more than a pound of sugar could be produced. The process is as follows:— Wood, or linen, or spane, it left to inship the own weight of oil of virtoris viewtustly the whole is converted into a viscid mass; care must be taken that it does not become too hot. This mass, being diluted with water, is boiled for some hours, the diluted with water, is boiled for some hours, the the sayer frome of after emporation. One insuedo pounds of sawdust will yield by this treatment one hundred and filten pounds of sayer; the same quantity of starch may be converted by a similar season of the sayer from the sayer is the sayer in the sayer.

Iron ships engaged in the sugar trade have to be very carefully looked after. The dminings from the sugar, in cases or in bags, find their way to the bottom of the ship, and have the effect of dissolving the iron. These drainings have to be removed and chemicals opplied to counternot the action of the sugar, else the ship's bottom would be ultimately eaten right away. Serious losses are sometimes inflicted upon shippers through the effect of different cargoes upon ships. Thus a ship that soiled outwards with a cargo of creosoto sleepers came back with sugar and coffee. So saturated with crossote was the sugar on arrival, that the consignee refused to take it up. It was consequently thrown upon the hands of the brokers, and they had to have it refined over again ere they could dispose of it. Another example of incompatible corgoes is wine ond tea. A fine China olipper was ruined for the ten trade by reason of a consignment of whee it once brought home. This contominated the ship, so to speak; it had to be overhauled, and is now engaged in the Anstrulian trade. Sometimes one notices on onlony flavour about eggs; this is due to the presence of onions in the some ship that brought the eggs over. So well known is the sensitiveness of eggs in this respect that those from Spain, whence we receive so lorge quantities of onions, are olwnyo stowed in the fore part of the ship.

QUICKSILVER. This mineral, known also by the name of mercury,

The appearance of quickediver, or mericary, is familiar to exergence from its employment in thorse-milliar to exergence from its employment in thorse-milliar to exercise the control of the uniform rate at which it expands, when subjected to heat, between writer range of temperature. It is remarkable as being the only metal that is find on the control of the contro

It comes here in wrought-iron flasks containing between 70 and 80 lb, each. Those are filled with laidles and a framed, and stoppered with serows, a vio being used to make the scrow in perfectly close so being used to make the scrow in perfectly close so made to arrive in skins of several thicknesses from which the wood had been removed. It has also arrived from some parts in bamboo ennes, closed with gum and with a wrappege of lines omemeted

The importance of leving this valueble metol carefully peaked was illustrated by a case in which a shipower sought to recover £200 worth of quickeliter from a ship-denning contrater. It is they may find it obligs: though volundes mo often found, the bulk is usually rubbles that is afficient to get rid of. In the case referred to, however, where a ship hold conveyed a consignment of where a ship hold conveyed a consignment of stitled well, the cleaner's findings were too valueble for the owner of the contraction of the co

is an important Rem in our insperts, and in 1897 represented a value of our £18,000,000, nearly double the value of our ten imports. Fir nione, multipl from Norway, Sweden, Russia, and North America, omounted to close on 14 millions sterling, leaving obout 4½ millions to be occounted for by oak, tonk, malogany, and other frauthure and hard

weods, and house-frames and oabinet work.
The leading part to receive these voes supplies of
The leading part to receive these voes supplies of
is the Surray Gommercial Dicks, the sentire of the
world Trade of the world. These docks cover an
area of nearly 460 acres, comprising ten deporture
reproduct for solving engoes. In 1890, the numberof' timber-inden vessels that cutzend these docks
years ago the timber trade was mainly carried on

in sailing vessels. Thus, in 1878, the proportion of steam vessels was only 10; per cent.; in 1890 it was unwards of 70 per cent.

Among the leading timbers of commerce a front place is taken by deal, the produce of the white fir, or Norway spruce. This tree, which attains a height of from 50 to 100 feet, grows extensively in the mountainous districts of Europe, and is especially prevalent in Norway. The form in which it comes over here is mainly as suars or deals. In preparing the deals which run to 12 feet in length, there are of course odd lengths. These old lengths, when not shorter than 5 ft. 6 in., go by the name of short onds, and are imported by lox-makers and packingense-makers. Lengths shorter than 5 ft, 6 in, me imparted as firewood, and are said by the fathour. 216 cubic feet going to the fathom. This, though called firewood, is not now used as such, but in the manufacture of small boxes, such as those used for macking starch or confectionery in. The posts that this kind of timber comes from are Unistianla, Friedrichstadt, Droutheim, Gothenburg, Riga, and St. Petersbarg. This kind of would is used largely for scaffolding, panelling, masts, and flooring. The deals are sold by the standard as tandard containing 165 cubic feet.

The Northern Due, also called the Damig figures with the preceding to make up the child dealers of the fraces of the Scandmarking-enhands and Rosch. It is, shipped from Stettin, Danig, Jenned, Broa, Archangel, St. Petersburg, and other North Earrep peats, in the finer of bey, plants II inclus wide, dask 9 herbs, while, and latters. Traches wide, the pulity varies in the different regions where it grows, the lambed, for instance, coming from the collect prices. When well a sound, however, it is considered to be almost as chandle and a complete the control of the lambed in thanks in a case of the control of the lambed in the conmiss, and, on a cutum of our kilpitous combined, with its stiffness, at is crusidered, the last thulse for bours, looks, girder, and princip

Truk is a mittee of different parts of India, of Burmin, and of Veylon, and is erecoclingly experative. It's word, by means of the pre-suce of a massless of the robots of the pre-suce of a massless of the robots of the pre-suce of the school of the robots of the preing the properties of the properties of the properties of the properties work required stronger hand dimability track is the word clusters. It's thus need extensively in shaplocation; and in the perametent way of radiancy—in the slape of beams and lays. It has been proposed to the properties of the properties of the uncessful for proof from pathlogic not leads and uncessful for the proof from pathlogic not leafs and

The oak that we import comes from both North Rurope and North America. None surpass the Prittsh oak in quality, and are used in inferior work -some for wheel-carriages, some for staves, and the best for ship-building.

Acacia occupies extensive tracts in America, where it is also called the locust tree, and grows to a height of 32 feet. When well sensoned it is more durable than the oak, and is used in building, in making posts, stakes, and fences.

The wood of the adder tree, though soft, is of great durability in water and when kept continuously wet. For this reason it has been extensively cultivated in Holland, where it has been highly serviceable for piles and swices.

Beech is found prefly widely over Europe, and, like the ulder, is highly dumble when kept in water. This makes it useful far piles and in ship-building. Its landness also renders it suitable for wooden translines, can inge-panels, and tools.

Coher is of many different kinds, the commonest kinds being the red coher and the litarounts color. The former is found in Canada and the States, and also is need mainly for wardness, effects, and the States, and it is need mainly for wardness, effects, from insects on account it is not subject to attacks from insects on account of this work. Which also protects the contrast of knowmals of this work. Becausada ender it also used in the making of powells. The latarounties death is after to to Hondriacy, Janualea, and Cada, whence B is seen protection in great and the contrast of the protection from the contrast of the protection in great subject to the contrast of the protection in great subject to the contrast of the protection in great subject to the contrast of the protection in great subject to the contrast of the protection in great subject to the contrast of the protection in great subject to protection in great subject to the protec

Likemus Vitae course chiefly from Central America, and Jamaica. It is noted for its barbases and admaica. It is noted for its barbases which, and, by reasonof fiscres-grained character, cannot be split with the zee. It matrices here from of billets about three feet long and a foot form of billets about three feet long, and a foot fittle. It is said barged by tumees in the formout of articles necessitating a bard clussegrained word; but mostly for suffects of billets.

A studiely word to furniture-makers, by reason of its effective appearance, is the laif-keye imple of North America. This is really a liberarely growth, or executence on the maple free, which grows to a great height, and is one of the most apart from the bind-key growth. In most operation that bind-key growth, has no special value. In spirit, when the sap begins to flow, it is ensteamy in many parts to tap the waple trees, the juice thus obtained being subsequently bolded and converted into imagic segar. Often in greater systements this was the source of the carly Camadian ended the same of the carly Camadian.

Lancewood comes from Culer and Guiana, arriving here in the form of poles about 20 feet long and 6 inches across. It is used in materials requiring strength and elasticity, such as the shafts of vehicles, and the bows of archers. GREEK. EXERCISE 123.

Translate into English :-1. Kal Spaths efficator efte roghe firden bulkus Λ. παι ρροσιν συραπολί στρατηγήν ελικοτό le τφ Το Εξεργαφία Θεριστοκλία στρατηγήν ελικοτό le τφ Περικοφ κολάριο. 3. "Οδισσεία πράς το μέγη Εδίρα Αθου βλθεν. 4. "He he μούρου έλην, ταύτου φέρε πολ ρά δημούσται. 5. Μη πίστασε τάχιστα, πρά άτρεπέωμ πέρας ζόμ. 6. Μὰ τοῦτο βλέψης, οἱ νεώτερος λέγω, άλλ' el φρανούντων τοὺε λόγους ἀνδρῶν έρῶ. Τ. Πένθες μετρίος τους άποδανόντας φίλους, ου γάο τεθνήκασιν, dad the aithe other, he effore their force deduce. restantisting.

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Expected 124.

Translate into Greek :--1. The Athenians took many soldiers. 2. The olty oloose Epumiacadas general. 3. Themistocles was chosen general by the Athenians. 4. Come, O friend, 5. O dear friends, come hither. 6. If thou art hungry, thou wilt est with pleasure. 7. The boy has entes all he had.

VERRS IN MI

We now pass on to the second great class of vorts—the verbs in -µ1, as they are called. The chief peculiarity of these verbs is that in the pre-sent, the imperfect, and in some cases in the second sent, the imperfect, and in some cases in the second aerist active and middle also, take special personcadings different from those of the conjugation in -w, and in the indicative of the other tenses want the mood-vowel. The formation of all the other tenses, with a few exceptions, coincides with the formation of the works in ---

Several verbs in -ps which have a monesyllabic. stem take in the present and imperfect a redaplica-tion—i.e., when the stem begins with a single consonant or a mute and a liquid, the first consenant of the stem is repeated with a; or if the stem begins with er, er, or an aspirated vowel, an aspirated a precedes the stem: as-

ΔΟ- 81-tu-μι, I give. XPA- κί-χρη-μι, I lend. ΣΤΑ- Τ-στη-μι, Ι ρίσου. Έ- Τ-η-μι, I sond. DIVISION OF YERRS IN -M.

The verbs in . ps are divided into two chief (1) Such as append the person-endlags immediately to the stem-vouchs. The stem of this

class ends in a. as f-ermus, I place; stem 2TA-. ,, 98-. c. . vi-bn-pa, I set;

. a. " M. Su-pa, I give; " AOn h , el-pu, I shall go; , 1-

(2) These to whose stem the syllable 200 or 26 is

GRERK .- XXII. [Continued from p. 175.]

VECUS IN -- WITH THE PRESENT STEM STRENGTHENED (confinent). VIII. Verbs where Tenses are formed from different

Roots, connected only in signification, alpéa, I toko (cg. a otty), tat. alpéau, perf.
Sporen, 2 aor. elou, êleir ('EA-), nor. para.
pieton, fat. pass. alpéfoque, mid. I alavas,
tat. alpéaune, aor. eloupe, perf. mid. or pass. floques ; 3 fut. photoenes.

2. Ipxepet, I ge, I come (the other moods and the present I so, I come (the same time also—necord-ingly lexams, in, its, item, in it imper, hexdune (commonly few or fo); fut, ifm, I shall go ((its, I shall come); perf. in fam. I 2 nor. 13.800, subj. \$1.800, opt. \$1.800, (or foun), imper. \$1.80, inf. \$1.800, part. \$1.8600, from POOL EATE.

 čelis, I ent, imperi, fictior, int. tšojan, peri, člifčena; (OAT-) 2 nor. čporjer, porjet, peri, mid. or pass. člifšerjen, nor. pass. fičećen. 4. splan, I see, I bohold, import. topur, port.

έώρακο; (ΟΠ-) fut. Εφυραι; mid. or pass. όρθεμει, όρθμει, porf. mid. or pass. ἐώρθμει οτ δμμει, ἐψαι, etc., inf. ἄφθει; (1Δ-) 2 αυτ. eider, ilu, ilean, ide, ilear, iléar; 2 perf. eile. I know; nor. mid. eidénny, iléaden, ilea, also ileá, behold! le! (Lat. ecce!), nor. paes. Egény,

dottore, fut. eptforger τρέχω, Ι ταπ; (ΔΡΑΜ-) int. δραμούναι, 2 nor. Εξομμον. porf. δεδρέμηκα, porf. pass. in compounds δεδρέμημα.

6. ofps, I lear, (OI-) fat. elew; (ENETE-), 2 nor. freyear (less often freyen), -es, -e, opt. drivcour, -ere, and -orge, -or, inf. dreyweir, part. dreyear, imper. freyer, -fre and -dree, oto., crymon, might, bryne, erw and erm, oto, (KNEK) poet, widow, port, mido or pass. briprayma (-ylus, -ywro or bripravra), aor, mid-heryadow, briyna, edwin, edwos, noc. pass. bright, edwydiou, int. brythiou; loss often olebhroum.

7. qual, I say, import. four, (RII-) 2 nor. elese (more soldom elva), elva, elvoqu, elve, -tru and -are, -erer and -arer, -frur and -arer, -are (comp. spicerse), circle, clede; from the epie pres. eips, fut. epi, perf. eipsen, perf. mid. or pass. εξημημ. 3 fut. εξηφειρικ. From PE, nor pass. έρμθες, βηθέτει, βηθείς, fut. pass. μηθέτειμε. Middle (only in compounds), fut. ἐστροϊμικ, mid 1 nor. ἀστεδείτει, to daubt.

to dany, an exercis.

ETPO-

appended, and which receive the person-endings at the end of this syllable. The stem of the verbs of this class ends-

- (a) In one of the three vowels a. c. o. and takes PPŪ; AS-
- a· σκεδά·ννυ·μι, I scatter ; stem MKEAA-. e- Kool-IVV-HI, I ratisfy : ., коре-. o- στρώ-νευ-μι, I spread out (strew); ...
- (b) In a consonant, and take re:-
- In a mute, as δele-ro-μ. I show; stem ΔΕΙΚ-. In a Houid, as ou-re-us, I swear: ... OM-. Of this second class, only the verb off. vo-m (ZBE-), I extinguish, forms the second agrist,
- (1) THE FIRST CLASS OF THE VERBS IN HI-In the active, the following are the terminations which mark the persons :-
 - (1) Person-endings of the Indicative Present.

Sing.	1.	+ μι	ns	∵στη-μι.
-	2.	. 5	**	T-orn-s.
	3.	-31(v)	**	ĩ-στη-σι.
Dual.	2	-TOY	,,	Y-STA-TOP.

*701 i-ara-roy. Plur. 1. -uer ï-arā-ucr. ---Terrate.

3 [-em.em(e)] ... | i-ara-rr. i-ara-ro.(r)]. The termination of the third person plural, sen, was changed into east, and then contracted with the foregoing stem-vowel of the verb. The Attie

dialect, however, admits the contraction only in the stems which end how; thus, while from T-gra-ray was formed leavingτί-θε-νσι became τί-θεισι; Attic 71-0/-agr.

» δί-δουσι: ,. δι-δά-àσ· \$1.80-200 Arfest not me Beik-rom; ., öris-ri-ásı. (2) Person-endings of the Indicative Imprefert and

Necond Agrist. Townson's V annual

Ding		.,	mpen.	less Aples.	(• TI • 0 7)
	2	-5.		1-στη·1	₹-11-87s
				i-arn	è-τί-θη.
Dual			2 Aor	ζ-στη-τον	₹-0 c- TO1
		-THE.		στή-τηυ	ċ-θέ-τη:
Plur	ı	-uev.		i-ata-mer	₹-0e-µег
	2.	.70		i-079-76	1-0c-re.
	3	-ear		€-077;-001	₹-θε-σα

In the dual and plural of the optative imperfect the n is commonly dropped, and the termination of the third person | head, spear, is usually shortened into .e. . ii---

vibel-nuer = ribetuer. in . al-nr = == ioraire.] Tibel-nour = Tibele. 6.Sor-year = Stooler.

In the optative second agrist of the verbs Tornus, τίθημι, δίδωμι, on the contrary, the shortened forms are very rare, except the third person plural.

Person-endings of the Imperative Present and and April

8.	201.	(ι-στα-θι)	(Ti-0E-TI)	(δί-δο-θε).
	3τω.	1.070.70	T1-86-TW	δι-δύ-τω.
D.	2ror.	T-STA-TOP	71-01-TOV	δί-δο-τον.
	3Ter.	j-ard-rar	τι-θέ-των	δι-δό-των.
P.	2. ∗τε.	1-07a-76	Ti-Oc-Te	δί-δο-τε.
	3 <i>twear</i> .	Ι-στά-τωσαν	τι-θί-τωσαν	δι-δό-τωσαι.

The second person singular imperative present throws away the ending -6, and in compensation the short characteristic vowel is lengthoused-that is, a is changed into n. e into en, e into ee, and e into #: thus-

ος (-στά-ντων τι-θέ-ντων δι-δό-ντων.

Γ -στα-θι	becomes	1-67n.
36-50-06		ðí-ñov.
7[-84-7]	**	τί-θει.
Sche-ri-01	**	อิสโต-หน้

The ending -0, in the present is preserved in only very few verbs. In the second norist of rignar, input and diame, the ending of has been roftened into o: thms, be-ri becomes bes; e-bi = es, be-bi = bes. In the second norist of formus, however, the termination

-01 remains : thus, arii-61. The termination of the infinitive in the present and second agrist is seat. This syllable is in the present added to the short characteristic yowel. but in the second norist is lengthemed, as a into n. e into es, and o into av.

Present. f-orá-ras. rs-0é-ras. di-dé-ras. dese-ré-ras. 2 Aur. gravrat. Britrat. Rat-un

The terminations of the participle in the present and second agrist are err, error, and er, which unite with the characteristic vowel according to the ordinary rules :-

l·στα·ιτε≡ί·στάς, l·στίισα. l·στάι. στάς, στίισα, στάν. Ti-Be-res = Ti-Belt, ri-Bilaa, ri-Bir. Bils, Bellaa, Ber. 81-80-175 = 8180/s, -050c, -61. Davis, Bover, Beir. беж-гр-гтs = бек-г ès, -(ea, -èr.

The person-emlines of the middle voice coincide with those of the verbs in - co only that in the second, person singular indicative and imperative of the present and imperfect they retain -on and -oo in their full forms (vot enforce, huiarw: bove, hoore; uple, impie, are the regular forms of good prose).

FORMATION OF THE TENSES.

In the tense-formation of the entire active, as well as of the middle future and first norist, the short characteristic rowel is lengthened—a into y_i into η and into e_i (in the perfect active of $i\theta\eta_{BM}$ and $i\eta_{BM}$), also ϕ into ϕ ; but is refulsed in the other tenses of the middle and in all the tenses of the passive excepting the perfect and pluperfect of τ/θ_{BM} and $i\eta_{BM}$, which receive the e_i of the perfect notive $(\tau/\theta_{BM}, \tau/\theta_{BM})$.

The first acrist active and middle of *10 ημι, τημι, and δίδωμι have for their tense-characteristic not σ but κ:—

The forms of the first aorist active (1890a, 180a, and 1880ac), however, are used only in the indicative, and especially in-the singular; in the other persons commonly, and always in the other moods and the participle, the forms of the second sorts are cenjulyed. So instead of the forms of the first aorist middle of *sfray, inp., and 8180a, those of the second diontive forms of the singular second anorist of *sfray, inp., and \$180au, those of the second diontive forms of the singular second norist of *sfray, figs., and \$280au (18-np. fig., and \$200au) are not to be semployed.

The verb lστημι forms the first active and middle like the verbs in -ω, with the tense-characteristic σ, as εστη-σ-ε, εστη-σ-άμην. The second acrist middle εστάμην is never used. Some other verbs, however, have the form, as επτάμην, βτριάμην, βτριάμην.

The second agrist passive and the second future passive are wanting in these verbs; also the third future, except in Tornu-tornica, or tornicate.

In regard to the signification of terms, observe that the present, imperfect, future, and first aorist active have the transitive import of to place. The second aorist, the perfect, and the pluperfect active, and the third future, on the conteary, have a reflex or intransitive meaning—to place oneself, or to stand.

(2) THE SECOND CLASS OF THE VERBS IN -HL.

The tense-formation of the second class of the verbs in μ s presents no difficulty. After enting off the termination $\nu\nu\nu\mu$ and $\nu\nu\mu$, and the tense-forms to the stem. The verbs in ν which lengthen this sinto ν in the present, retain the ν in all the tenses, as $\nu\nu$ in the ν in ν in

REMARKS ON THE MODELS.

In the dual and plural of the indicative, and in

the other moods and the participle. for the first aorist active, the second aorist active is used.

Instead of the forms δ-θη-κδ-μην, δ-δω-κδ-μην. first agrist indicative middle, the Attic forms are

The perfect and pluperfect, keryene kerýni (mit hot sierýni), from the dual and the plural immediately from the dual and the plural immediately from the stem, as perf. kerá-ren, firrépen, keráre, kerá-rené); pluper f. kerá-ren, firrépen, keráre, kerá-rené traden (p. 1886). The participle moise serious is unauly comployed. The participle moise wise, seen, sée, gen. séros. séens, na well as kernesés, sien, sée, gen. séros. séens, na well as kernesés, sien, sée, gen. séros. séens, na well as kernesés, sien, sée, gen. séros. séens, na well as kernesés, sien, sée, gen. séros. séens, na vell as kernesés, sien, séens,
KEY TO EXERCISES.

Sc. 113.—1. The expedition will sain to-morrow. £. Anoth what beev against the expedition. 5. In the exadjat in the Oriona pall the Proponentian siere as many of the Athenius approach the city, the soldies will match by their arrange and run to the gates. 5. Honora affirs have often been been found to the pates. 5. Honora affirs have often been been found to the pates. 6. Who would not be pates of the contract
Rr. 114-1. 'Il orparia l'éléphoreu. 2. 'Il organia l'eléphoreu.

Rr. 6 l'apprent blégas d'unero q'i prosaga moi. à l'absorca
al d'arque teòrica q'i organiq eleveraux. S. 01 organica s'humes
d'arque teòrica q'i organiq d'enveraux. S. 01 organica s'humes
d'enveraux spèce en vibles. C. 10 ele d'arque teòrica. T. 10 el
arque teòrica se d'enveraux. El considereux el considereux.
L'apprentation d'enveraux eleveraux elleveraux.
L'apprentation d'enveraux elleveraux.
L'apprentation d'enveraux.
L'apprentation d'

Ec. 115.—1. Many well things have brillars the soldiers in the expedition. S, Py associating with use some thou thyself is expedition. S, Py associating with use some thought Sparts. 4. Hany who have do not knowledge the concentration. S The derivation is thus drawed of think (He. *) Areing deviately. 6. I will not dealer up the wint. T ally the appropriate for each of the city's The hars was bitten by the dog. 10. You will not arrive at the assumit a without tool. 11. The vomen put on the city's The hars was bitten by the dog. 10. You will not arrive at the summit without tool. 11. The vomen put on 11. The friend pressured to come to one, up by the obliga-

Επ. 110.—1, Η γωνή ημπέσχετο κολά ίμάπα. 2. Ή γωνή αμφέρεται καλά ίμάπα. 3. Οι φόλιο ψείτχουτο αφιξεσθαι. 4. Ο στρατηγέε τους πολιμίων εβάσσον είτ την σύλιο έλλων. 5. Οι δεί τους κασούργους αποτίωσουτο. 6. Πολλεί φόλιο συνέπισεν. Τ. «Νόλε συγκάννετες εξήφο ήγωσται. 8. Πολλά όρλοι συνέπισεν παικί συνέξη ένδαθε έχχομέσμε. 9. Τον κακούργου έκτίτου 'Απάλλωγ αποτίπαι."

Ex. 117.—1. Let not the evil man think that he will escape notice for ever. 2. If you have done justly, you will have God as your ally. 3. It is right to learn letters, and, having learnt, 144 64

, 1

to have weadons. 4. The king did not percess the plot against innext. 6. The Francisco were heatful to the Greeks. 6. Phillip timest's need to declare that the look tecrosic consideration of the look terror and the look terror look the look the look terror look away 9. Do not think that you have been forgotten if you have form onry ourself to God 10. It spood not to exagainst once a funded. 1. It is is happy who has genued a need friend.

The 131.—1. You will first be men who are followed companions in trouble. 2. it is Greet for all men to date. 3. We brand the dead. 4. Men remember with pleasure smelent deeds. 5. You cannot find a man who be completely for every regree in the contract of your wise-claims, do not at all artifulate to the goods what time lefalls on (like poor fate of the chings). 5. If any one who is old years for like the description to the minute many decades of

F. 120.—1. Oldína fraipor merbe le galantis mpáquaesciopea. S. 28à pasquaes form desdestin. S. Herdő the falometya vir oldinen. L. Herdő the galantiya vir elémmetya vir oldíne. S. Herdő the galantiya vir elémháfisirante elém-7. Desdesa é sabót gir é sabór normalesl. Holdá merci de ver eus entigos. N. Lároner ders noldálétyapezes, adv. de méra. 10. Oldi el méga filor danneslétyapezes,

Ex. 12.—1. The oblifters with infred themselves, sensites the enemy. Like now the versed when thance for year chairs, 2. The shephend will fred the flock of goats on the mountains. The shephend wild fred the flock of goats on the mountains, the flow of the whole the man of the flow
Ex 102.—1. II dela drepphy. 2 Neph thy delar. 2. II midde trappyers toke medicalous. 4. II red, mi delectors brighted from the property of the financial designation of the Neph middle middle and Sightersa brighted and the defeated from the designation of the delay
TERMS USED IN COMMERCE.—I.

ABANDONMENT.—In marine insurance, the net of relinquishing to the insurer nll interest in a damaged ship or caugo, in order to claim for the entire amount insured.

	customary contractions
re:	
r at.	Inst Instant-present
t/c Account.	mentis.
LD Auno Domini.	Int hiterest.
After a Anteneridiem-	Inc Involce.
lecture none.	J Journal.
mt amount.	L'C Letter of Credit.
Int. brot. Amount brought	Es.d Pounds, abil-
ferred, forward,	Jings, pence,
test carrel. Amount carried	,ings, pence,
	Let Ledger.
	Mesers Messieurs -
4.P Last Year.	gentlemen,
lico Hanco.	Mdec Merchandisc.
nt Dank.	m/d months after
DIL 1111 of Lading.	ilate.
P Hill parable.	m/m made merchant-
II/R Hill receivable.	able.
Z.R Cash Book.	me menth.
Commun Commission,	m/s months after
Co · Commony.	Malit
Cr Civilitor.	M.S Manuscript.
net, ore, the hundredweight,	N.E. Nota hene -
nuertere.	Mark well.
rounds.	N.J North Britain.
Cw Currenay.	
D.B Day Heak.	
Ild days after date.	o,a on account of.
Dir Discount.	2 per cent.
doz dozen.	er , diets , ounees, penny-
da draft.	pra. weights, grains.
	2* per.
Dr + - Delstor.	A.c Price Current.
ii/A. • • • «lay « nîter right.	n/c per cent.
E.E Errors excepted.	p m post merkilem-
L. & O.E Errors and only-	after noon.
sions excepted.	Proper Premium.
Er Exciringe.	Prog Province - next
Ent Examined,	month
fo follo.	Ult Ullimo-last
F.O.E Free on board	mouth
F.P.A Precofranticular	tle namely
average.	
ABSTRACT An phylik	gment or epitome of nn
anti- day description	hands or of tollie of the

entire deed, document, or book.
ACCLPTING A Bill...—The writing, by the person
on whom it is drawn (called the Accurron), of his
name necess the Bill. By this he undertakes to
pay it when due.

ACCOMMONATION BILL.—A bift of exchange necepted by an individual for the convenience of the drawer or indivise, with whom it rests to take it up at unnturity.

ACCOUNT (1/c).—A statement of the sums due

by one 'person to another, either for goods, or, originating out of any mutual tran-sactions.

ACCOUNT CURRINIT.—A statement of transactions between two or more parties during a certain period, drawn out in the order of their dates, and in Dr. and Cr. form.

ACCOUNT SALES.—An secount rendered to a merchant by his agent, showing the weights or quantities of each purced of geode sold, with the prices obtained, and the net result after deducting all expenses attending the sale.

ACCOUNTANT.—A person skilled in accounts.
The official in charge of the accounts of a business
is termed an accountment.
ACQUITTANCE.—A discharge in writing for

noney, debt, or liability.

ACTUARY.—The officer of an Assarance Company, whose duty it is to make the computations required in the business, and to advise on all questions pertaining to the statistics and finance at assarance. Also are bild to similar officers in other

questions perturning to the desirate med measure in absentance. Also applied to similar officers in other businessor.

ADJUSTAINT—In marine insurance, the sottlement of a loss incurred by the insured.

ADJUSTAINT OF AN ACCOUNT,—Agreeing or settling the particular.

AD VALOREM DUTY.—Duty lovied on the value and not on the quantity ar weight of articles. ADVANCE.—Aloney paid on occenit of goods to be delivered or work to be done.

ADVESTURE—A sposalation.
ADVICE—ADVICES.—Information by letter; commercial reports and intelligence conveyed by lotter.
APPIDAVIS.—A declaration is writing upon onth.
AGENDA.—A memorandom book.

AGENT.—A person authorised in transact basiness for another, who is called the principal. AGIO.—The difference between the real and somiant value of monoy, or of paper currency and

"ACTUSITY—A periodical or yearly paymont. ACTUSITY—A periodical or yearly paymont. ACTUSITY—A chronized—Christopey—Assentites Certain are annual payments for fixed terms at years, commencing insellingly. Deferred Assentites are musual paymentially. Deferred Assentites are musual paymentially as period apreed upon. If either at these two electrications of namidities depends upon the actions on one one one live, they are termed Zife Assentities. Contingent Assentities are symbols on a two clients of a person it topy are not to clean to a person it may are not be resulted.

Reversionary Answittes.

Affrance—To set a price upon, or to make an estimate of the value of anything. The set of apprenting its known as making an AFFRANCHIMT, and the person design so is called an AFFRANCHIMT, and the person design so is called an AFFRANCHIMT, and the person design so is called an AFFRANCHIMT, and the person design so is called an AFFRANCHIMT, and the person (who are called AMMITTATOME), chosen by consent of those conperions.

ADMITIATION OF EXCHANGES—A computation of the proportional rate between two places, through intermediate places, for the purpose of succreaining whether direct or indirect drafts and remitiances are the most advantageous. When

necessaring whether direct as indirect drafts and remitances are the most advantageous. When one intermediate place only is concerned, it is

termed simple arbitration; when more, compound mibitation.

Altriumed of Association—A deed containing the terms of agreement made by a number of persons forming a trading firm or joining in a secondation.

speculation.

ASSITE.—A general term for cash, property, and dependencies, in contradistinction to liabilities.

ASSIGNEE.—One to whom an assignment is made.

Assertance—convolved to resident a transporter to the convolved to the con

(See Insertance.)

ATTACHIEST.—A notice prohibiting the sale or disposal af the goods of ony debtor to the hunds of a third party, until notice shall have been given of the settlement af all claims against the owner. (See Garnielswest.)

ATTORNEY (POWER OF).—A decement granting

to others the power to sign and not fee the granter other in special cases or nurseorvedly. (See Prevention.) ATTONEY (WARRANT OF).—See Werman of Alternay.

AUCTION.—A public rate of property to the

highest bidder.

AUDIT. — An examination of accounts and resolves by natharised persons known as Albutrons.

ANATHAGE—(General—Partiretts)—In marino insurance Gineral Arrange is a proportionate contribution levied on the owners or insurance of a bilp or its enrap encedling to value, when part of the cargo or skip has been sarefided for the preservation of the remainder. Partiretion's Average is so called in contradistinction to General Arrange. In this case this loss is totally borne by the owner or

Insurer.

AVERAGE-STATER.—A person employed by the hasured to prepare statements of averages propertory to their ediptement with the insurers. These statements, which are paid for by the lasurers, are niften of an intrinsic character.

AVARD.—The decision in a case of arbitration.

BACKWARDAYION. — A consideration paid to purchasers for an extension of time by speculators on the Stock Exchange unable to supply the stock or slarges they have contracted to deliver.

or shares they have contrasted to deliver.

BALL—To release a person or goods on receipt
of security for their reappearance. The person
gring the security is torneed a BAIL-BAR. And the
document he signs is called a BAIL-BORD.

BAILMENT.—A delivery of goods in trust, on the understanding that they shall be re-delivered as soon as the time or purpose for which they were bailed shall have claused or been accomplished.

BALANCE.—In accounts, the difference required to equalise both Dr. and Cr. sides.

BALANCE OF TRADE.—The difference in value between the aggregate amount of a country's exports and imports.

BALANCE SHEET.- A statement of the assets and liabilities of any trading concern.

BALL.—A pack or parcel of merchandise bound up in a wrapper of paper, canvas, or any similar stuff.

BASCO.—A Continental term for bank money.

And the control of control of the co

BANK BILL. A promissory note or bill of exchange issued by a bank, and payable at some fature date.

BANK CHARTER—A chanter of incorporation

granted to the Corporation of the Bank of England, The liest was granted to Mr. William Paterson Obe projector of the Bank of Eugland), on the 27th of July, 1694, for three years, and this has been renewed, with modifications, from time to time since-the last renewal being in 1811. The Bank transacts the financial business of the Government at a small percentage, and has the sale right of issuing Bank Notes for a distance of sixty-five miles round Lomion These notes, though but promises to pay, are a legal tender, and are issued against a sum of about fifteen millions sterling lent to the Government under the Charter, together with the account of bullion in reserve. What is generally known as a Suspension of the Bank Charter is a suspension of bullion payments by the Bank for these notes, relieving for a time the Bank of England of the obligation to pay these notes in gold, and yet keeping them a legal tender. It amounts, in fact, to an Act of Indemnity to the Corporation of the Bank of England against any loss they might sustain by issuing their " promises to pay," or notes against private securities whose value might depreciate. It is only done to allay a

panie, or a great demand for gold in the money market.

BANK CHIDIT.—A credit by which a bank, or receipt of proper security, allows a person to draw on them to an agreed extent.

EANGER.—A licensed dealer in money, who grants boars, discounts bills, and receives deposits at interest; he also acts as an agent for the payments and receipts of others and facilitates the tentitance of money from place to place.

BANK NOTE.—A promissory note, payable on demand, issued by a banking company.

BANKBETT.—One who from Inability to pay all his debts in full is compelled to close his business, and to put his nilars in the hands of his creditors or resignees for settlement.

BANKENTY'S CHETHYLATE.—A document granted by the Court of Bankenpley, and re-commission of the leadkrapt, and investigation of his affairs. It is the paracle to allow first, second, and third class certificates, according to the nucles of each particular case. In extreme cases, a certificate is alloged by refused, when the parties are termed morriflected bankrapts. A bankrapt is discharged by the certificate from all previous obligations. Under the new Bankrapts Act, no practed in is granted to the bunkrapt miles or until he pays ten shillings in the pound.

BANKHUPTCY COURT.—A court established to inquire into the cause of a bankrupt's failure, and to regulate the administration of his effects. BARKATRY.—Any net committed by the master

or crew of a vessel by which the owner or insurer is defrauded.

BARTER.—The exchange of one kind of commodity for another without the aid of money.

Biane—A speculator on the Stock Evelvage who contracts to deliver stock or shares, which he adoes not possess, at a certain price and at a future fixed period; his expectation being that a full of the market quotations will allow that to buy them at a lower rate, previous to the arrival of the day amonimed for settline. (See Full.)

BILL OF EXTER.—A schedule of goods cutered at the Castom House.

BILL—BILL OF EXCHANGE—A written order from one person to another to pay a third party, or anyone whom that third party may appoint, a certain sum of money.

Bill or Hillian,—A certificate granted by properly authorised persons of the state of health of the crew of a vessel, and of the port which it

Bill of Lading (B/L.).—The masters acknowledgment of goods received on board a ship, and agreement as to their delivery, freight, etc. They are usually granted in sets of three—one to be sent by the shipper to the consignee, the second to be sent to the same party by an after post (in ease of loss of the first), and the third to be kept by the shipper in the event of any claim arising against the insurers through loss or damage.

BILL PAYABLE (B/P).—A promise to pay money at a future date.

BILL OF PARCELS.—A bill or specification of goods sold. The term is falling into disase—invoice. account, or bill being generally adopted in its place.

BILL RECEIVABLE (B'R).—A promise by a second party to pay the owner a certain sum of money at a future date.

BILL OF SALE.—A contract conveying to others any specified interest or right a person has in goods, chattels, ships, etc.

BILL or SIGHT.—A form of entry at the Custom House when the importer or consignee of goods is ignorant of their exact description or quantity; it allows them to be landed for sighting or inspection, that he may be enabled to make a perfect entry for them.

BILL OF STORE.—A Reence from the Custom House nuthorities, granting permission for ships' stores to pass free of duty; also permitting the reimportation of goods legally exported from the United Kingdom.

BLACK LIST.—A name given to printed lists (privately circulated among subscribers) of bankrupts, bills of sale, and other matters concerning the commercial standing of individuals and firms.

BOAND.—The directors or managers of a department of the State, public institution, or company, in their collective carnetty.

in their collective capacity.

BONA FIDE.—In good faith. An expression used to imply that anything is done without fraud or

BOND.—A written instrument by which a person binds himself to pay money at a certain time or under certain circumstances.

BONDED GOODS.—Goods in bond are those liable to duty, and stored in certain licensed or bonded varehouses, after bond has been given on behalf of the owners of the goods for the payment of such duty on their removal for home consumption.

BONUS.—An extra dividend to the shareholders of public companies; also applied as a term to periodical additions made to policies of life assurance consequent upon the general profits of the company assuring.

BOOK DEBTS.—Amounts standing in the books of traders as due to them. They are generally classed as good, doubtful, and bad.

BOTTOMBY.—The mortgage of a ship by her

master or owners for the purpose of obtaining means to effect repairs, or to precure may requisite for the skip. The lender takes the risk of the loss of the skip, and it reasts with him to insure it; but of the loss of the skip, and it reasts with him to insure it; but the agreed amounts of interest. A bond is usually given for the money so obtained, which is termed a Bettempy Bend. When a lean is precured on the course, which may be solid or exchanged during the voyage, the borrower's personal responsibility becomes the clief security, and is termed Repearance.

BOUGHT AND SOLD NOTES, -See Brokers' Con-

BOUNTY.—A premium for the encouragement of a particular branch of industry.

BROCAGE, OR BROKAGE.—A commission gained by transacting business for others, mostly used when the transaction has been illegal or of a mean description.

BROKERAGE.—The percentage or commission charged by a broker for negotiating any business. BROKERS.—Persons engaged to transact business, or make bargains for others. The principal

Are—Produce Brokers, Bill Brokers, Stock Brokers, Ship Brokers, and Insurance Brokers. BROKERS' CONTRACTS.—Notes signed by brokers

and forwarded to their principals immediately on the completion of purchases or sales; they describe the goods, and the conditions under which they are sold. These are also called Bought and Sold Notes.

BULL—A speculator on the Stook Exchange, who contracts to take stock or shares (which he has no intention of paying for) at a future fixed period, and at a certain price, his expectation being that a rise in their market quotations will enable him to sell at a higher rate previous to the arrival of the day for settling. (See Bear.)

BULLION is properly uncoined gold or silver, though the term is often used to denote those metals both in a coined and uncoined state.

CALL.—A demand for money on account of or due on shares in public companies.

CAMBIST.—A person skilled in the exclanging of money of various countries; also a name given to a book in which is given the equivalent in one country of the money, weights, measures, etc., of other countries.

CANCEL (To).—To cross and deface a bill or bond of any description, by which act it becomes of no effect.

CAPITAL.—The original sum of money embarked in a business or public company, as it may stand

nffected by subsequent gains or losses.
CAPIÁS AD SATISFACIENDUM (or Ca. Sa.).—A

writ commanding the defendant in an action at law to be arrested and kept till his debt be paid... CARGO.—The goods ond merohandles contained in a vessel. The person whose duty in the ship it is to look after the cargo is called the seper-zergo.

is to look after the cargo is called the supercargo.

OMH ACCOUNT.—An account in which nothing
but cash transactions are recorded.

OHAMBERS OF COMMERCE.—Local associations
of commerciol men, formed for the purpose of

regulating and protecting their general interests.

CHARTER—A grant from the Chown conferring privileges upon public companies, corporations, and institutions upon certain conditions.

CHARTER PARTY—An agreement with the owner

or master of a vessel, hiring it either for a fixed period, a voyage, or a number of voyages; CHEQUE OR DRAFF.—An order to a banker to pay the bearer, or a party named on the order, a certain named sum of money.

S P A N I S H . — X I I . [Continued from p. 188.] THE TENSES OF THE SUBJUNCTIVE MOOD.

THEME are in Spanish three forms of the imperious subjunctive, one ending with rea (in the first person singular), another with refa, and the third with rese. Each of these forms is generally to be rendered in English by some of the auxiliaries, should, rould, each essent may require. These forms as generally to be rendered in English by some of the auxiliaries, should, rould, or of the sense may require. These forms of the imperious reach as the superior of the imperious reasons are require. The form ending with reg is employed only whom

a coaditional conjunction, or an ejaculatory expression of desire, or a verb of command or permission, comes before it; as—

Em preciso que espusiere nits Le dife que tomaso ceos libros, razones, il sons necessary that I fold him that he might take I should explain my reasons.

Sometimes the conjunction gwe is not expressed, but understood; as— Energy is envised mayor He differed (that) they should easily this a greater quantity. The form ending with se can be employed after.

the relative pronouns, and after quanto, as much as, quantos, as many as, when they are preceded by a verb expressive of an action which the other part of the sentence shows to depend on choice or mere contingency; as—

Prometic que me daría todo lo

Que le pidiese,

"Ile promised me that he venid
gira me excrytking which I
might call of him.

The form ending with ria is employed (generally to express a rish or condition, or what would be or wight be done) when no conditional conjunction

t comes immediately before the imperfect tense; as—

1. Can de los dos preferira V. 7. Si ella vintese, irism, if she in prefer the two would you prefer the two would you prefer the should come they would go.

This form can likewise be used when the imperfect is preceded by a verb that expresses belief, trust, or promise; and also when the conjunction si (if) is used in the sense of whether; as—

Prometió que mo daria dos Lo preguntó si su hijo irie alla, liberes, he promised that he unid gire me tro bobs. he asked him if (sobether) his hould gire me tro bobs.

The form of the imperfect ending with -r* may in general be used for either the form in -s* or that in -r*a: and is especially to be preferred to the form in -r*a, when interrogative pronouns come before the imperfect; as—

I think me hallon con allo. Yo enteres mue viriesen. I will have I could find much you cope.

It will be seen from the foregoing rules that the common in -ra can generally be used instead of the forms in -sa and -ras for we can say, sty o marne, or

at yo amazo, if T should here; and we can say all amazo, or 6 amazo, a seventle here. But we cannot use the form in -ric as equivalent for that in -re. Sometimes the English maxiliaries, could, sught, should, and resuld, are expressed in Spanish by a separate verb, followed by the infinitive; as

No podfa ver, he could not see (was not oble to see). No querfa entru. he would not enter (was not swilling to enter).

The perfect indefinite tense of the subjunctive mentions a doubtful or contingent action or eventas being completed, or that it would have been done in past time under certain conditions; as—

Poro me importa que lo haya Il concerns me l'ille sokether he oldo degir o no, may have heard it spoken or

The pluperfect tense of the subjunctive mention a doubtful or contingent notion or coven that would or neight have been completed under certain conditions; and is glac used in Spanish whenever in Engileh a conditional conjunction or expression of continuous and wish precedes the pluperfect indicative; as—wish precedes the pluperfect in

The hallyst to ayer a in cateing of bulbene setato between the content of the hold for a creeble que hubben y shreedynado à more hardy shreedynado à more hordyna. Od Jefende es ne.

Child hubicse yo sido esta. On their I had been studious I diese!

This compound tense of the subjunctive is used with the endings in -ra, -ria, and -r of the auxiliary

with the endings in -ra, -ria, and -rc of the nuxiliary verb haber (hubicra, habria, and hubiss), under the same conditions and in the same manner as these endings are employed in the imperfect tense; as -- SPANISH. 235

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Si no te habiera pigado, yo ta
babra perstato dinero; or,
si no te hulo se pogado, yo
len Rec more; properto, yo
     is no te habiera pigado, ye te
habra pe stado dinero; er,
si no te huba e pagado, yo
te habiri puestado dinero;
or, si no te hubiera puestado dine-
ro; er, si no te hubiera
pagado, yo te hubiera puesta
```

pagado, 300 tasto dinero ;

The form of the last example, though permitted, is not to be recommended, since the ending -ra occurs in the conditional proposition (sino to hubiera panade), and also in the principal proposition (no te

hubiera prestado dinero). Nor could we change in any case the principal proposition of the sentence, by substituting hubiese prestade, since the form in -se can be employed only with conditional conjunctions or exclamations, etc.

There is in Spanish a peculiar method sometimes employed for expressing such a contingency of nn action as is implied in the pluperfect tense; this consists in prefixing the preposition of before the infinitive haber, and affixing the past participle of the verb to be used. Thus, "a haber venido" is to be rendered the same as "si hubiera (or hubiese) venido," if he should have come, or, as it is generally expressed in English, if he had come, or, had he come. So "a linber hablado" is to be rendered the samo as "si hubiese lublado," if he had spoken.

The first future tense of the subjunctive mentions a doubtful or contingent action or event as to take

place at a future time :--

future action or event shall occur :---

The second future of the subjunctive mentions a doubtful or contingent action or event as-having taken placout a future time at or before some other

Si Pedro no hubiere llegado intes de amanece, le escui-bue una carta, le escui-bue una carta, escui-

A verb is not necessarily in the subjunctive mood because a conjunction may precede it; for an action or event which is known to be certain requires the verb to be in the indicative mood, even though a conjunction precede it; as, "though John was speaking low, I heard him distinctly," aunque Juan hablaba, etc. If, however, there is uncertainty or doubt expressed, the subjunctive mood is required; as, "though John were speaking, I would not listen." aunque Juan hablara, etc.

After the relative pronouns or the adjective cuanto, how much, or the adverb cuando, when, if these pronouns or this adjective or adverb are themselves preceded by a verb expressive of an action which the other part of the sentence shows to depend on mere choice or contingency, the subjunctive mood is used, though in English in such cases the indicative is generally employed; as-

Elige, pues, de estas maranjas la que mas to agrade (or agradare), (or) the coronges (or) please or shall please (dont place or beat place the)
Sere rico enaudo quieta (or I bialike rich vhen fortune wills rometto daruna, (or i bialike rich vhen fortune wills frometto darune el dinero que (i.e., r hea fortune roop vill).

It promised to give me the
money that I wanted (might

Verbs expressing mill, desire, command. permission, promise, fear, doubt, probability, fitness, or necessity, followed by the conjunction que (or any other conditional conjunction), generally require the verb which follows the conjunction to be in the subfunctive mood (and not in the indicative, as in English): as-

Dudo quo tengan saccite, I doubt uhriber thou heast (auaget he Bowshide quo tengan uras, it for too the third that he has (auag heavy) prostite that they has (suny) have) proste the third heavy and the saccessary that 1 100 (auago).

There are some conjunctive plurases which, as they imply a condition or doubt in themselves, are always followed by the subjunctive mood; those are: para que, in order that; dado que, granted that : no sea que, lest : a ménos que, unless ; a fin de que, to the end that ; con tal que, provided that; antes que, before that; supuesto que, suppose that; on caso de que, in case that; blen que, although;

sin que, without or unless that ; como quiera que, notwithstanding that ; por mns que, however ; slempre que, whenever that ; ojala, would that, or would to God that ; as, hable para que puedas juzcar, I speak in order that then mayest be able to judge.

The conjunction ought always to be expressed in Spanish; as, "he promised as [that] he would come," nos prometió que rendria.

THE PASSIVE VERB.

The passive verb is generally rendered in Spanish by ser, and always when the subject of the verb is acted upon by an agent-that is, when in English it would be accompanied with the preposition by;

Este discurse fue escrito por This discourse was written by

The passive verb must be rendered in Spanish by estar when the past participle is used adjectivelythat is, when the subject of the verb does not seem so much to be acted upon by an agent as to have its . state or condition described; as-

El discurso estavo bitueserito. El libro esti correjido, the the discourse was well written. Look is corrected.

The passive verb formed by ser is used in Spanish

in the present and imperfect of the indicative mood only when it is designed to express a mental act or a state of the emotions; as in this example-

Maria es annula de Cirlos. Maru is beloral los Charles. When a mental act or a state of the emotious is not expressed, the pussive verb, if it be used, must

not be in the present or imperfect of the indicative mood; thus, we cannot say, el libro es escrito por un Español, the book is written by a Spaniard, but. el libro ha sido escrito por un Español, the book has been weitten by a Spaniard. When a mental act or state of the emotions is ex-

pressed, the prepositions do or pur may be used after the passive verb before the agent; but when a mental act or state of the emotions is not expressed, por only can be used; as-

Todas las coons fueron herbas Maria es numba de (or por) por Dies, all dange core Carlos, Mary is televid by mult by hel.

The reflective pronoun as is often used with verbs of the active roice, which are required to be rendered in English by the passive

THE REGIMEN OF VERBS.

The object or regimen of the verb is either direct or indirect. The direct regimen is that on which the action immediately falls without the aid of mry preposition; us

Doy use rioms. I stice jen.

The indirect regimen is that on which the action of the verb cannot fall williams the aid of a prenosition: as-

Pigo A la mayer, He raid to the 1' 1' er. Sometimes both regimens are required after the

verb; us Die nea riema a la sone r. Heaven sen to the r -on.

When the object of an active verb is a person or insultante thing personified, it must be preceded by the preposition d ; as in these examples-

La muner à quien vinnes noire. De gervier de la madre de Juan, non, the restina whom we man. Junes : in the nother of John. se med ruch.

Sometimes the harmony of the sentence requires the ii to be suppressed, especially after the persons of the verb tener, to have or to possess : as-

Tengo un bijo y tres bijas, I have one r m und three daugh-One verb governs another in the infinitive mood:

...

Ouecen instarte. They want to imitate him.

Some verbs, as a general rule, remire the preposition a before the infinitive which they govern, such as those which mean to attempt, to come, to go, to begin, to derote, to offer, to dare, to serve, to invite,

* This is a very important rule of Spanish syntax.

to learn, to teach, to urge, to assist, to call, in advise, to submit, to prepare, to compel, to decide, to remain, and to accustom oneself; as-

Probin à levandarse, he at- Yoy à verla, I am going to see temphel to rate, himself, her.

Some verbs generally requiré the preposition de before the infinitive which they govern, such as these which mean to crase, to be glad, to be ashamed, to resolve, to deprive, to fail, to finish, to abstain, to pity : as-

Dejó de estudiar, he courd to No taliaré de haterio, I will not feet to do it.

When the preposition to in English is used before the infinitive in the sense in order to (no be labourate nequire fame, menning he labours in order to acquire fame), the prepo-ltion para is used in Spanish before the infinitive: as-

El houster for crisio para as- Man was created in order to pharm to felicidad, marre to felicida.

Sometimes que precedes the infinitive instead of per or para; as for example-

He last evething (which) to tell thee. Twac algo que decirte,

The infinitive is often used without any premosition before it, especially when it is governed by verbs which mean to be able, to permit, to wish, to endrayour, to make, to frian, to one, to seem, to be went, to know, to arail, to see, to hear, to succeed, to hope, to be necessary, to think, to believe, to promise, to drian, to be the duty, to pretend, to judge, to prescribe, to require, to suffice : as-

No puede haceria, he is not Beson aprender, I wish to

The infinitive in Spanish, when used as a present participle in English, may take any preposition before it : as-

Sinth la mercidad de ponede de la lineada, la memor de la lineadad, la companie en mande, de la constant on baira her. The verbs to see and to hear never govern the ground in Spanish, but always the infinitive; thus,

we cannot say, le vi viendo, I saw him coming, but, le vi venir. I sur kirs come. To know how is expressed in Spanish by to know; 25 --

Yo no sé nadar. I know not (Lore) to main.

The infinitive, when governed by another verb in Sumish, is sometimes required to be rendered by another mood in English; as-

Pieusy morte de alegria. He thinks to die tthat he will the) of joy.
He knows to our his verit |that Sale deter su mérito à Dios his merit is owing) to God alone.'
I believe to see (that I see) my Creo ver á mi pulre,

When in English a reflective verb, or a verb im-

in the present and imperfect of the indicative mood only when it is designed to express a mental act or a state of the emotions; as in this example—

Maria es meata de Chrica. Mary is believed by Chertes. When a mental act or a state of the emotions is not expressed, the passive verb, if it be used, must not be in the present or imperfect of the indicative mond; thus, we cannot say, el libro on escrito por un Español, the book is irritican by a Spaniard, but, el libro ha sido escrito por un Español, the book has been switten by a Spaniard,

when a mental act or state of the emotions is expressed, the prepositions de or per may be used after the psessive verb before the agent; but when a mental act or state of the emotions is not expressed, per only can be used; as

Tolas les cours fueron bechan Haris es annala de (or por) per Dios, ell things ucce Garbu, Mary is beloued by seade by Got.

The reflective pronoun se is often used with verbs of the netive voice, which are required to be rendered, in English by the passive.

THE RECIPIEN OF VERES,

The object or regimen of the verb is either direct or indirect. The direct regimen is that on which the action immediately falls without the aid of any proposition: as—

Doy ura plants, I glica pen.

The indirect regimes is that on which the action of the verb cannot fall without the aid of a preposition; as—

Die 4 is muger, He said to the woman.

Sometimes both regimens are required after the serb; ns--

Dio ma pluma & la muger, He gaze a pen to the woman,
When the object of an netive verb is a person or

inanimate thing personified, it must be preceded by the preposition of a sain these examples— La muger dougs whom we saw then the sources whom we saw that the sources whom we saw

Sometimes the harmony of the sentence requires the d to be suppressed, especially after the persons of the verb tener, to have or to pleases; as—

Tengo un hijo y tres hijas, I have one son and three daughters.

One verb governs another in the infinitive mood :

Queren instarte, They want to instante kins.

Some verbs, as a general rule, require the proposition is before the infinitive which they govern, such as those which mean to attempt to come, to on.

to begin, to devote, to offer, to dare, to serve, to invite,
This is a very important rule of Spanish syptax.

to learn, to teach, to urge, to assist, to call, to advise, to submit, to prepare, to compel, to decide, to remain, and to accustom oncest; as—

Probo & berumtarse, he at Yoy & verta, I am young to sea fempted to rease himself. her.

tempted to rests histard!

Some verbs generally require the preposition debefore the infinitive which they govern, such as
those which mean to cease, to be glad, to be salesswel,
to resuler, to deprine, to fall, to finite, to chatting, to

pity ; us— Defà de cabulant, he ceused to No futiant de huserto, I will study.

When the preposition to in English is shed before the infinitive in the sense is order to (as he laboure to acquire fame, meaning he laboures to order to acquire fame), the preposition years is used in Spanish before the infinitive: as:

El hombre fue criado para as- Han nous created to enter to plare a la felicidad,

Sometimes gue precedes the infinitive instend of yor or ways; as for example—

Tienn algo que decirte, He has something (which) is tell

The infinitive in often used without any preposition before it, especially when it is governed by verbs which mean to be able, to permit to while, to endeavour, to wake, to felign, to one, to seem, to be word, to know, to each it, one, to learn, to enceed, to, laye, to be necessary, to think, to believe, to provide, to defin, to be the duty, to present, to judge, to pre-

scribe, to require, to suffice; ns.—

No puede incerto, he is not Desco aprender, I wish to able to do it.

The infinitive in Spanish, when used as a present participle in English, may take any preposition before it; as—

Sints he recented the ponerie He fit the necessity of pricing at an amount of his tree constants on amount.

The verbs to see and to hear never govern the grand in Spianish, but always the infinitive; thus,

gerand in Spanish, but always the infinitive; thus, we cannot say, he vi riendo, I saw him coming, but, he vi venit, I new him come. To know how is expressed in Spanish by to know;

ns— Yo no sé nodar. I know not (kom) to suriss.

The infinitive, when governed by another verb in Spanish, is sometimes required to be rendered by another mood in English; as—

Pretsa morre de alegría,

Sabe deber su méelto á Dios

Ba hyunt do cas his verit (shat ha veilt deber su méelto á Dios

Ba hyunt do cas his verit (shat ha veilt de saung) to Cod

airon.

Creo ver á mi padra,

Deless to see (shat I see) my

When in English a reflective verb, or a verb im-

Juan está do níola, John to in the finitus.

La comida está en la mesa, the dinner is on the toble.

Está de rodillas, he is on has knese.

Esta og en prisa, I am in kaute.

Esta og en la en la estan, he is in bed.

Estar (and not ser) is always employed before the gerund, since this serves to show the manner of being occupied; as—

Jorga està silbando, George is Ellos estàn leyendo, they are sending.
Ella estura regafiando, she seill Estor eserbiendo, I am writing.

Estar is sometimes used with a preposition to form a particular idiomatic phrase: thus, estar sin means to be destitute of; estar 4, to understand; estar en, to be resolved on, to know.

The manner of using ter and exter in forming the passive voice has already been explained.

IDIOMATIC USE OF CERTAIN VERBS.

Volver 6, to return, to repeat, is used before an infinitive whon it is required to repeat the action denoted by the infinitive, in which case the adverbagain would be used in English, and the infinitive be rendered in the same tense as refer; as—

Valvi à verie, I saw hiss again Volvió à escribir la caria,* he (literally, I returned to see re-wrote (or un ote again) the him).

Acabar de, to finish from, is used before an infinitive in the sense of to have just, and the infinitive is rendered in English as a past participle; as—

Juan acaba de llegar, John has Acaba de verle, I hare just seen just arrived.

Estar para, to be towards, is used before an infinitive in the sense of to be ready, or to be about to; as—

Estabau para seabar sus està. They were about to finish their dies,

Estar por, to be for, is used before an infinitive to share that the action implied in this infinitive is not yet performed, but that there is a disposition to accomplish it—that is, in the sense of to be not vet, or to have a wind to : as—

La cava està por acabar, the knuce is to anich, i.e., the going (or hure a mind to go) home is not get finished.

Quedar por, to remain for, is used before an infinitive in the same manner as estar por, in the sense of to remain set: as—

La caria queda por escribir. The letter resains yet to write (remains to be written).

Haber de, to have of, is used before an infinitive in the sense of to be to, or must; as-

* Literally, he returned (or repeated) to write the letter. It must be kept in mind that this is the usual mede in Spanish of expressing the repetition of an action, instead of using a word corresponding to again in English. No han de hacer uso de ellos, He de trahajar, Lau to (I must) they are not to (must not) make work (or I have to work).

Tener que, to have what, is used before an infinitive in the sense of to have to, or must; as-

Tiene que levantaise al romper He has to vise by break of day.

Llegar a, to arrive at, is used before an infinitive in the sense of to come to, or to succeed in; as-

Cuvudo el hombre llega á guatar los encantos de la virtud, la prefiere al vicuo,

Venir á, to come to, is used as llegar á, in the sense of to come to; as—

Les dones vienen à ser perjui- Gifts come to be injurtous.

ciales,

Hacer is used impersonally before nouns referring

to the weather, and is to be rendered by the verb
to be, and sometimes with the adjective; as—

Hace color, it is het. Hace been tiempo, it is sur-

Hace calor, it is het. Hece limen tismpo, it is fair tenther.

Tener is used in the sense of to be before nouns of measurement, with the preposition do in the sense

of in, as—

Golidik tenia de altum acis Golidik nos in height six cubits codos y un paimo, and a span.

Oustar, when it is to be rondered in English by to like, has for its nominative case in Spanish what is the objective in English, and its objective in Spanish is tho nominative in English, preceded by the preposition of, the sentence generally containing what in English would be regarded as a redundant pronoun; as—

¿Le gustan á V. patatas? do Ella me gusta á mí, I ilhe her.

Faltar, when it is to be rendered in English by to mast. or have need of, requires the same idiomatic construction of the sentence as austar: as—

A Podro no le falta dinero, Le faltan tres vacos, le wante Peter svants (or needs) suit (or needs) three temblers.

Hacer falta, to make need, is used in the same manner as gustar and faltar, in the sense of to have need of, to stand in need of; as—

Me have much falta el consejo I stend in much need of your de V.,

Pesar, when it is to be rewitered in English by to repend of, to be sorry for, is subject to the samependiarity of construction as guster and falter, except that it is used before an infinitive with the proposition do, which infinitive would in English beused as a participle; as—

A Dies le pesa de haber hoche God repents of kaving made Saul king.

"It repents God for having made Saul a king," would be a more literal rendering of this last example.

THE ADVERS.

Adverbs are either derivative (or primitive) or

adverbial phrases.

The simple adverb, when it qualifies a verb, generally comes after the verb; as—

La religion express sublime- Religion expresses this truth name esta verdid, sublimely.

THE ORGANS OF SENSE.-X.

V.—THE ORGAN OF TOUCH (continued).
MULTITUDE of other points of interest might

A MULTITUDE of other points of interest might be dwelt upon did space permit. Thus, sensitiveness to tickling, and the improved appreciation of objects by moving the skin over them, would lead us into considerations quite different from those connected with simple touch.

The sense of heat and cold is different from that of simple touch; and sensitiveness to these has no relation to the cognisance of tacfile sensations. If with a cold finger you touch your brow, though the finger will feel any roughness on the brow far sooner than the converse, yet the brow feels the finger cold far more distinctly than the finger feels it to be warm.

We pass on to notice briefly some yet more important applications of the sense of touch; and in order to do this, it must be explained that the means by which we distinguish between hard and soft, rough and smooth, elastic and non-clastic, sticky and slippery bodies, by which also we gain our ideas of the form, size, distance, and situation of bodies, involves other sensations than those of simple touch. These ideas lie at the foundation of all mathematical science which treats of time and space. They are derived from the joint senses of touch, and of what has been called the "muscular sense." Simple pressure produces a sensation, as when a body is placed on the palm of the hand while its back rests on a table, but if we remove the table, or lift the hand from the table, a further sense of weight is conveyed to the mind. This idea of weight is derived from the knowledge the mind has that the muscles which hold the hand no are being exerted. So if the tip of the finger be passed along the edge of the table, it creates not only a consciousness of a number of successive contacts. but also a consciousness that the muscles of the arm and hand are exerted, and their position and condition is being continually altered. Now the nerves which run from the muscles to the brain are quite distinct from those which run from the skin which overlies those muscles. These nerves, too, are quite capable of conveying definite information to the brain without the assistance of the nerves of touch. The naked arm (in the dark) may be passed through the air, where it touches nothing, and yet the range of its sweep, the position to which it is brought, and the amount of effort remained in the state of the same range of the sweep, the position to which it is brought, and the amount of offert remained the same range of the same range of the same range of the others being impaired, and a case is on record of a mother who could hold her child while he looked and it, but directly she looked away she let it full, because the muscular sense (not the muscular power) was gone.

Having indicated the distinction between the muscular and tactile senses, we must leave the reader to follow out for himself the complicated applications of these combined senses to gain a knowledge of outward objects. How, for instance, both are necessary to distinguish india-rubber from clay or from marble; and how the ideas of length. extent, and solidity are gained by passing the hund in one, two, or many directions over the outside of bodies. Let him also notice the wonderful ndaptation of the human hand to obtain all this information. If he will take the trouble to do this, he will be struck with the marvellous complexity of tho ideas which come trooping into the mind when so simple an action is performed as the grasping an object with the hand. A very remarkable instance of the muscular sense is shown by the way in which the fingers, for instance, obey the will; let the reader will to touch the tip of his nose, the lobe of his ear, the angle of his jaw, his navel, his great toe -no sooner does he will it than it is done.

It has been shown in the previous lesson that the sense of touch, in its wider sense, is of a highly intellectual character. As an informant of the mind it is second only to the sense of sight, and in the suggestion of abstract ideas, it is, perhaps, supprior even to vision itself. There is no fundamental conception in relation to matter which it cannot impart. Though devoid of every other sense, a man possessed of this can pursue the study of every science, if he will but surmount the difficulties which oppose themselves to his acquisition of the results of the experience of other men. Thus, blind men have taken to the study of mathematics, and by the aid of the figures of Euclid, conic sections, etc., given in relief, have acquired a knowledge which has placed them in an honourable position in the examinations at Cambridge. The very theory of light and all its laws are quite comprehended by such blind students. The sense of touch is absolutely bounded by the surface of the body, but it SPANISH. 237

plying command, governs an infinitive in the passive voice, in Spanish this infinitive must be in the active voice; as-

State of

No to dejon veneor malo, sufer 'El rey no lo mandó dar, the not thuself to be overcome of ting ordered at to be given to When a verb is governed by another in English,

and can be rendered in another mood by using the conjunction that, this latter mood should be employed in Spanish; as-Expero que tendré el gusto do I hope to haze (that I shall haze)
verba en brove, the pleasure of seeing hase

VERRS POLICIPED BY CERTAIN PREPOSITIONS. Verbs which signify to compare, to give, to yield, to resist, to 'concern, to belong, to refuse, to ask, to promise, to one, etc., generally require the proposi-

verh passes over; as-

Ella ne pareça à su madra.

Demanda abbiduma ai Seltos,

Lord.

Lord. Sometimes verbs having the sonse to remove or to take away require the preposition a hefore the noun to which the action of the verh passes over; as—

Cain quité in vida a zu herma-no Abel.

Cortaron in cabeza é Saul.

Cortaron in cabeza é Saul.

They est of the head of (10) Saul. Verbs denoting to be abundant, to lack, to be astonished, to blame, to repeat, to pity, to make use, to absolve, to make sport, to remember, to forget,

indirectly govern a nonn by means of the preposition do: ns-Los valles alumdan do trigo,

Los disciples se asombraron

Los disciples seer astersished at

de sus valibras,

Los and casa do perros,

The tailings absent with (qf)

Olvidar, to forget, is followed by de only whon it is used as a reflective verh; as-

Olvidarse de le pasade," Olvidar sa nombre,

The verb acr, when used to imply property or essession, requires the nonn denoting the possessor to be preceded by the preposition de; as-The book delongs to (15 of) my El libro es de mi padre,

De generally precedes nouns which denote the causes of which the verb explains the effect; as-Tientible de micelo,
Trata de frio,
Sue oper so beliaron de higri.
Ille sper serre vert seuls (of) colo.
Ille sper serre vert seuls (of)

. The preposition & (to) should not be used in Spanish when we speak of motion merely directed towards a place, but kdeis and pers : as-

* Literally, to farget onciclf of the past.

Estă caminando hácia Tolom, He is journeying iosurels Tol Mi podra salló para Madrid, My Saller est out for Modra Gerunds require the same prepositions as the verbs from which they are derived; as-

Acordindose de sus obcus, Resembering his seories. Norz.-The student will find at the ead of the series of lessons a useful table of verbs governing certain prepositions.

USE OF THE VERBS SER AND ESTAR. The right manner of using the verbs ser and estar, being of great importance, and yet attended with some difficulty to students, we will give a few

explicit rules. Ser is used to affirm the existence of essential, natural, permanent, or characteristic states or qualities of the mind, persons or things, and to

affirm what, or of what a person or thing is, was, or will be; as-Si yulo es frio, for fe still.

Si yulo es frio, for fe still.

Si yulo es frio, for fe still.

La mitel ce dulce, honey is

to not sent apparatus.

La mitel ce dulce, honey is

to not sent apparatus.

La mitel ce dulce, honey is

to dealth, for feel to
The natural beauties of the body, and its defects when regarded as permanent, are affirmed with ser;

Lucis es hermosa, Lucy is Ella es corenbada y ciega, t she beautiful, 12 huntp-becked and bifuit. The materials of which anything is made are affirmed by ser; also the possession or destination of anything; as-

Os may tuning; ma—
La tana es do com, the cup és of Es do din, it is sing
Loddonous es do la rema, the
Coronis ta for quest's.
Cervintes es do Alexia, Cercentres to Poss Alexia.

Jane Cor 1 per la print Maria, Más
Jane Cor 1 per la print Más
Ja Estar is used to affirm the temporary, non-natural,

accidental, or contingent condition or location of ersons or things transient emotions of the mindthat is, to affirm how or where a thing exists,

existed, or will exist, at any poriod of time; as-Et trempo estari, unulado, the Estoy alegro, I am merry.
Esta confusio, he is anyy.
El mar esta sirado, the sea is Yo astaba ciego, i I was blood.

The physical changes and state of health of the animal body, as also the chemical and mechanical changes of sabstances, are affirmed by estar; as-Extry breeno, I am well.

Yo which anjo, I was home.

La lecke exist agric, the sulfe is an exist.

La conne exists agric, the sulfe is an exist.

La conne exists a seeds, the ment source.

In affirming any manner, situation, position, or location of persons or things, ertar is used; as-

† That is, personently blind. ‡ That is, blind for the time.

what is part of itself, and therefore has to be monisfied, cheri-bel, and defended—what is foreign, and therefore may be used or avoided, as it is wholescate or axotons. Indeed, the sense seems indispensable to all mainths that are not plunged and freed, threugh every slage of their life, in the middof a medican which is both air and do do do herenment of the vectority kind.

In the higher animals, and in all these whose means of defense lie more in their active powers than in defensive arm or, the sense of touch is distribute I over the surface of the skin, as in man, Every ruch animal may be commuted to an Island. The boundary of its body is the coast-line. Along the whole of this are placed, at various intervals, places of look-out, just as our own tight little island has been surrounded with martello towers. These stations are few and far between where the coast is rocky, abrupt, and inaccessible, but nearer together at those parts where a descent could be easily made, and crowded together at the outlets of ports, creeks, and river-months, 4hrough which an active commerce is carried on. The comparison of the extremity of the tactile nerves to martello towers is the more appropriate, because these have ceased to be of any use in defence, and have become stations of outlook for the coast-guard. So the tactile nerves are, in themselves, no protection, but rather, in being delicate organs, they need protection; for they act as alarmists, awakening and calling up the active powers to fight in defence of the common country. These two functions of the skin-namely, that of passive defence and netlye alarm-are complementary to one another; where one is very efficient, the other is less needed. In the scaled and mailed fishes, and in such forms as the tortoise among reptiles, and the armudillo among animals, the function of sensation is sacriseed to that of defence; but in the naked-skinned anhals the sense of touch has need to be very acute. In comparing man with the lower animals of that class to which he belongs, we find that his sense of touch is, perhaps, better developed than that of any other animal. The lower animals have to sacrifice a certain amount of their sarface sensibility to the paramount necessity of being shielded from the cold; or, to put it more truthfully, to the retention of their animal heat. Man has neither the continuous thick coating of hair of the ox, the thick skin of the rhinoceros, nor the dense accumulation of fat below it which is found in the pic and in the whale. He is only cosmopolitan because his superior intellect enables him to clothe and house himself. His nearest relatives among beasts, though much better supplied with hair than himself, are confined to the tronics. Man makes himself at home everywhere, but only by becoming a "clothes philosopher." His triple investment of ordinary, nether, and over clothing proves him to be an exotic species. He supplements by art the line of defence at those points where nature has left him exposed. The main use of the conting of hair is, no doubt, to defend the brute from the winter's cold, but that which will keep in the heat will keep it out, so that it may be considered as a defence against the excessive heat of the sun also. Doubtless the universal presence of hair on the heads of both sexes of the human species indicates that in his native home man had more to fear from sunstroke than from the cold of winter. Besides this, the hair is sometimes a real defence against the rough usage of the outer world. Thus the manes of the lion and the huffalo are real shields both against trenchant blows and the werrying of the teeth of hostile animals. Even the matted hair of the negro is said to be able to resist a tolerably forcible sabre cut. The principal use, however, is doubtless to defend from cold; and it is remarkable how this main object is arrived at without much prejudice to the function of toucla

Few solld substances are lighter than hair, even when pressed close; and few substances are worse conductors of heat -su that brutes retain their licat by the aid of a substance which costs them but little in the way of carriage. Beyond this, the springy, stiff, yet soft texture of hair makes it plways permeable to the air; and air, when mattouless, is a bad conductor of heat, and adds absointely to weight. Hence on the coldest day, when the thermometer stands below zero, the beast is still surrounded with a layer of warm air, almost equal in temperature to its body. So much to prove its efficiency for its main purpose. Now we have to show how it leaves the sense of touch, if not unimpaired, at least not obliterated. The reader must refer back to the illustration on page 177 to understand the structure and relation of each hair to the skin in which it is developed and fixed. The hair is essentially a tubular projection of the cutiele, firmer and denser in its composition, being made up of closely-pressed, elongated, spindle-shaped cells, instead of scalelike, easily detached ones. It is not, however, produced from the level of the surface of the body, but from a bag or follicle, which is always narrow, and more or less deep as the hair is long or short. This horny tube dilutes at the bottom of its bag to enclose a vascular papilla, similar in every respect to those papille which lie immediately under the surface of the superficial cuticle. The hair itself, like the rest of the enticle, is without sensation, as

indeed it need be for the comfort of the animal; but the papilla has not only blood-vessels but nerves, and is very sensitive, so that the hair cannot be pulled or moved in any direction without affecting the sensitive part. Though a furred animal cannot precisely tell the exact point at which it is touched, on account of the length and flexibility of its individual bairs, yet the sensation of touch is as truly conveyed to the true skin as it is when the pressed ridges of the forefinger of man cause feeling to be excited in the papille beneath them. In one respect linits are even advantageous to the sense of touch, inasmuch as they reach considerably beyond the surface, and thus the range of the sense is extended. This advantage is so far recognised by nature that certain hairs are specially developed which have no other use than that of touch. These may fairly be described as taotile organs. These hairs are usually, and almost exclusively, situated in the upper lip, projecting from the most prominent part of the muzzle. In quadrupeds the snout is of course the most salient part of the body, and is most used in investigation. These whiskers, as they are called (though they would be better named monstaches), are remarkable for their length and etiffness, the depth to which their large bulbs run into the skin, and even protrude in the internal surface, and also for the largo nerves that enter the papills of the bulbs. Those coming from the whiskers of the scal as they run togethor look like the strands of small cords as they become woven into a rope of tolerable thickness. The animals in which these whiskers are most developed are the carnivora and the rodentia. This is not improbably associated with the fact that these are for the most part nocturnal animals. Moreover, many of the rodentia inhabit holes in the ground, trees, etc.; and many of the smaller carnivors, are always poking about in holes and grannies for prev. It certainly would be an advantage to a fox on a dark night to be able to gange with his whiskers the size of the aperture in a hen-roost before he tried to force his way through it; and thus it has been thought that there is a relation between the width of the body and the extreme extent of the whiskers.

ELEMENTARY POLITICS.—III. [Continued from p. 193]

THE SPHERE OF GOVERNMENT (continued). WE have seen that Governments in the last century claimed a very extensive control over the action of their subjects. About 1792, however, Wilhelm von Humboldt, who afterwards became the Prussian Minister of Education, wrote a little book, which

was not published till many years afterwards. The true end of man, he said, was obviously to develop all his faculties as much as possible. To do this. (1) he must have a great deal of freedom; (2) he must be placed in a variety of situations and associate with people of very various characters. But that there may be variety of character. there must be general freedom. Now, supposing the Government steps in and says, "Such and such knowledge, or such and such traits of character, are specially desirable," and proceeds to train the citizens to get them. Here at once variety is decreased. Or suppose, instead of letting the citizens get things for themselves, it provides them. Suppose, for instance, that a college or a musenm is provided out of taxation and not by . private enterprise. The public interest in it must be much less than it would be otherwise; people care more for things that they have taken trouble to get. And, the more Government action there is, the more laws there must bo. There will therefore be many more breaches of the law; and as some of these crimes will be morally judifferent, things will be punished that are not morally wrong, and law in general will be brought into disrespect.

Humboldt's doctrine was naturally very distasteful to the Prussian officials who controlled Stato education, and laid down minuto police regulations designed for the good order of the nation. Much the same conclusions as Humboldt reached were adopted by those who were struggling for civil and religious freedom in England. They laid stress, too, on the inefficiency of Government action as compared with private enterprise, because the machinery of Government (they said) is much more complicated; it is slower to move; the officials are more hampered by tradition, and have less direct interest in the success of their work than privato persons usually have. A more philosophical line (very like Humboldt's) was adopted by John Stuart Mill in the "Treatise on Liberty." He pointed out the importance of individual vigour of thought and action, and the great danger that if Government provided extensively for the welfare of its subjects. they would cease to provide for themselves. His book should be read by every student of polities, and we need only notice that he allowed much more of indirect protection than Humboldt did, and that he praised, what Humboldt expressly condemned, national compulsory education.

More recently Mr. Herbert Spencer has again maintained a view he first put forward many years ago (in "Social Staties"), and has since repeated in essays called "The Man versus the State" and "From Freedom to Bondage" (the latter in "A Plea for Liberty"), His view is that all mer

makes amends for being less far-reaching than other sonses by being the most rend of ull the senses. We make our nitiuatu appeal for it when the eye gives false or comfusing indications. In the King's That this sense, when combined with the muscular sense, is of a highly intellectual character, does not at all contradict the statement that it is also the simplest and most radimentary of the senses,

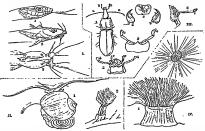


Fig. 1.— Observed Tention of Tention and Particles of Street, I made of Activities 1 mag. Detailed the Activities of Tention of Tent

Palice at Amsterdam there is a wilmost palicel to copyred girms as, it they projected from, and were copyred girms as, it they projected from, and were considered to the copyred from the copyred to the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the season of the copyred from the copyred from the copyred from the season of the copyred from the copyred from the copyred from the season of the copyred from the copyred from the copyred from the season of the copyred from the copyred from the copyred from the season of the copyred from the copyr That it is simple and reallmentary agrees well within the that that and thereby orientees now be found of the first that and thereby orientees now be found of this same renders for love drown in the minimal and that that the desire speed forman. Dichards the contrast the contrast production, and the contrast production of the company of sense are formal; mut the renders of extensive feedback productions of contrast the contrast contrast the contrast contrast the contrast contrast the contrast the contrast contrast the contrast the contrast contrast the contrast contrast the contrast contras

or Victoria, or any other English colony, make peace or war, or conclude treaties, on their own necount. Now, some of these partly sovereign States have assigned the part of their sovereignty which they do not retain to a Federal Union of which they are members along with other similar States. Sometimes, of course, States ally themselves permanently for certain purposes; and such a permanent alliance of several States is called a Confederation. In a Confederation the various members each retain their sovereignty, while they bind themselves to not together in dealing with other nations. But in a Federal Union they do more: they set up a central government and assign to it their powers of making war and peace, and of legislation on certain specified subjects—generally us to rustoms duties, coinage, the postal service, certain commercial matters, and of course the defence of the country; and they generally agree that none of them shall pass certain kinds of laws or do certain acts-c.g., the various States of the American Union have bound themselves not to granttitles of nobility and not to permit slavery.

Partly sovereign States may be either dependcucies (c.g., New South Wales or Canada) or members of a Federal Union. A Federal Union is a body of semi-sovereign States, which reserve part of their sovereignty and delegate the other part to a central government. Sovereignty in a rederal Union is held to reside in the governments of the single members and the central government, all taken together. Any sovereign State which is not a Federal Union may be called n minary State. Such a State may of come have dependencies, as England has. And the dependencies themselves may be semi-sovereign Federal Unions, as Canada Is. Federal Union only comes in where there is a coural government to which part, but not all, the severeignty has been delegated by a group of States severally.

Federal Unions may be either Republican or Monarchic, but these existing (with one exception, the German Empire) are in fact Republics.

Let us now turn to another principle of division-sells number of authorizes with whom the soveregning rests, or the composition of the sovereign led, if there is only a single rater, the government is called a monarchy; if the government was in the lands of a number of persons who were exempt from the legal control of the rest of the regulation, it was called by in forces an oligarchy, requisition, the called by in forces an oligarchy in the control of the control of the rest of the population, the valled by the forces and oligarchy in a state of the control of the people, the Greeks called it "the trade of the people," of emoneracy. By combining this with another division—into Abeointe and Constitutional—the philosopher in the philosopher another total reached six types of State. An absolute the programment is one which does as it likes, which regard to principle or tradition; a constitutional regard to principle or tradition; a constitutional operation of the programment has regular principles and traditioned that momentum and the programment has regular principles and traditional that momentum are the programment of the programm

In modern times we have not got much beyond this division. "Republic" is sometimes used for democracy, though historians (as in speaking of "the Datch Republic" in the seventeenth century) often apply it to States where the sourcine power is in the hamls of comparatively few of the citizens. And "absolute" and "constitutional" States differ chiefly in the degree in which they are bound by tradition. The despots of the little Greek cities. who were often mere adventurers plandering the people while they could, might (for a time) do nactive much as they liked. But a modern despot is very much in the hands of his officials, and they act on some sort of principle. Moreover, in some States the Constitution is written down: in others there is nowhere any formal authorised sintement of it. Yet it does not follow that there is less respect for it in the latter class. England is among their number, yet England is eminently constitutional.

It would be difficult, however, to make more than a rough clas-ification, chiefly because the torm and the spirit of a government may differ widely. The old-fashioned division into monarchies, pristocracies, and democracies would class together the Governments of England and Russia, though . the Government of England has infinitely more in common with the Hepublican Governments of the United States and France than with the despotism of the Czar. In almost all governments which are called monarchies, the sovereignty, in the legal sense, is not in the hands of one person, but of a king and a legislature which is either partly or wholly elected by the people. But the courtly language of official documents sometimes tends to obscure the fact. And in every country in Western Europe the great majority of the nucle population. have votes. Besides, many of the types of government have now only an historical importance. Aristocratic republics and (except in Russia) abso-Inte monarchies have ceased to exist among civilised nations, and are unlikely to reappear. It is best, therefore, to enumerate the three leading types of government at present, omitting for the moment two peculiar cases, the German and Austro-Hungarian Empires.

Constitutional Monarchy.—Nominally in this
type the head of the State is an hereditary king (or
in some cases a queen), called for conciseness "the

having equal ciains to happiness, which can only be defined as "consisting in the exercise of the facuities," Government should secure to each man that exercise, free as far as possible from other people's interference. But it should do no more. It should not protect men against pussible inter-ference—should not, for instance, punish drunkennoss beenuse drunken men may do harm, er even take precaations against the spread of infectious disease because people may eatch it. Such action really defeats its own object; it leads people to trust too much to the Government, and to take little trouble themselves; it increases taxation, and so decreases the means of imppiness; it involves a great deal of actual interference with freedom ead happiness for the cake of what is after all only a chance of increasing them; and Governments very frequently, make gross mistakes-more frequently, it is maintained, than private companies do. Let overy man be ne free as possible, and let the weak and foolish perish of their own wenkness and folly. This is the way nature acts. It will be better for

mankind so in the long run. At present there is a strong feeling against this view overywhere. (1) Government seems likely to become much more democratic and much more efficient than one of the above writers expe (2) It is seen that it is very difficult indeed to draw the line between direct and indirect protection of liberty. Is a man to be free to propagate infection which may injure hundreds of people, merely be we cannot say exactly who will be injured? If not, is he to be free (for instance) to keep his hour or his yard in such a state that it may assist in propagating infection? Or is a man to be allowed to publish immoral books, which, though ther usty not directly cause offcaces against other people, yot interfere with moral character generally, and so indirectly promote these offences? (3) The notion that we are to allow olvilised society to keep up the "struggle for life" we see in nature is denounced; civilisation, it is said, aims at gotting rld of this struggle, and giving the weak a chance. Moreover, mon are complex beings, and a weak person (that is, a person who would find it difficult to live unless the "etruggle for life" were mitigated a good deal for him) may often have qualities most valueble to society. Why should we not -- if we are eure we can do more good than harm thereby-let the Government (that is, persons delegated by our-selves and our fellow-citizens, and, on the whole, a good deal wiser and abler than most of us) do se thing to mitigate the struggle for life? If they abuse their power, they can be called to account; if they fail, other agencies would very likely fail too. . It is on those kust two contingencies that the

debate now 'delefly turns. Governments, it must be remembered, are very countrens anachines, under a great variety of influences, and far has responsible a great variety of influences, and far has responsible to the contract of the contract of the contract of the often difficult to far the responsibility one so, the persona. And it is well to keep the principle of liumboldt as to the end of the finte in view leaving each special case of extending of flate interference to be decided on grounds of expediency'. It may simplify what we have been arriging to

summarise it thus:—
The functions of the State are—

(1) Parely and directly presentive of breaches of right, as when the State panisies theft or murder. Nobody disputes, of course, that these belong to the

(2) Indirectly percentive of breaches of right: \$\phi_s\$ proventing the spread of infection; require \$\phi_s\$ proventing the spread of infection; require buildings to be put up under certain restriction; to machinery to be femed; restricting fangaceue trades, \$\phi_s\$, that in explosives or intextennts; passishing somes forms of immoulty, which, therefore, parts behaviore and inpure society; unifrectly, and parts obstracter and inpure society; unifrectly.

(3) Promoting welfare possibly by means involving restriction; e.g. antional compaisory education,

limitation of bours worked in factories.

[It is often difficult to separate these from (2)]
(4) Promoting welface by providing institutions, etc., which anight otherwise be provided by private enterpiate (e.g., the Post Office, the telegraph, the

Dritish Museum).

Sometimes (4) involves a certain amount of restriction of iadividual freedom; thus, people must not carry letters for profit and so compete with the Poet Objec.

Fort Omee.

It would generally now be held, as to (2) and (8), thay restraint should be undertaken only in order to secure more liberty for people in general. Some people are to be compelled to do what they dislike, that people in general may have a better chance of more varied nativity.

As to (4), the question in each case will always be one of expediency. Government may not do the work more chengly than private people; but not alming at profit, it may serve the public better.

FORMS OF GOVERNMENT.

It is been to begin by classing floats, an a sovereign and parties to begin by classing floats, and parties and parties of the property of the constant curricular to the state is one whose corrections in the consecution territories by its subordination to some or other floats. Thus the English Government might (though practically it moves does) reduce to cancello any particular is moved does) reduce to cancello any particular its passed by the Legislature of the Denzision of Ganzado or any Australian colours. Nor can Counda

monarchy. These types we may call Parliamentary (which includes, more or less, all existing monarchies save Russia and the French Republic) and Presidential, of which the leading instance is the United States. The Presidential Republic which exists there (and has been copied throughout South America with more or less success) grew out of the English monarchy: it is the English monarchy of the last century, with an elective Upper House, a Lower House cleeted by a very wide suffrage, and a Cabinet which advises the President, but is kept apart from the Legislature. Its members have not seats in cither House; if they have a communication to make, they do so in a formal message, and they do not, like an English Minister, attend to be questioned as to the work of their departments. When the American system was formed, in fact, the Cabinet did not hold its present position in England, and much had been written as to the necessity of keeping the Legislature and the Executive distinct. The American system, however, has grave defoots. The Prosident and the two Houses of the Logislature are cleoted for different periods, but not in the same way. It is quite possible, therefore, that the President may be of one party and one or both Houses of another; and it often happens that before the President's term of office has ended, he and the Congress are in conflict. Nor is there any one official authority to initiate legislation. In England, practically the pressure of business is now so great that no important legislation is likely to pass unless it is introduced, or promoted; by the Ministry. The Ministry has by custom control of the order of business in the House, and can secure time for its discussion. But in the United States Congress there is also great pressure, and there is nobody in Congress constitutionally in the position of the Ministry. The difficulty has been overcome by a constitutional understanding. The Speakor of the House of Representatives (who is not mentioned in the Constitution at all) is allowed something of thesame power of deciding what business shall be taken first as the Prime Minister has in England, and it is quite understood that he is a party man, and that he does what his party desire in the arrangement of business. It is understood that "he must not go too far," but of course nobody can specify exactly where he ought to stop. In politics as in private business, such limitations must be left to the tact and judgment of the person acting, and the opinion of the persons whom he deals with.

The Continental "constitutional monarchies" all more or less follow the Parliamentary type of government, and so does the French Republik. Usually a private member of the Legislature (or in some cases of the Lower House) may bring in a Bill—i.e.

propose a law. But it is understood that the most important Bills will be proposed by a member of the Ministry, and that the Ministry will devote its influence to getting them passed. If it is defeated in the Lower Honse on any important question, it either resigns or dissolves Parliament. (Were it to refuse to do cither, the majority in the Lower House could ordinarily make government impossible by "stopping" the supplies"-i.e., refusing to vote money for the ex; penses of Government.) Generally it resigns, though, in some cases, as in Germany and Austria, custom does not require it to do this if the defeat is concerned with a matter of executive policy rather than . of legislation, provided it still commands the confidence of the Crown. Usually in these countries the Cabinet is recognised by law, and the Ministers are . also (as in England) members of one or other House of the Legislature; but they often have the right to speak in either House on matters affecting their own department, but not to vote except in that House of which they are mombers. Moroover, in some cases the Upper House of the Legislature co-operates in preparing Bills to be presented to Parliament. In the French Republic the President is elected by both Houses of the Logislature sitting together, and he cannot dissolve the Legislature without the consont of the Upper Honse. Otherwise, he is much in the same position as an English king or queen, dismissing his Ministers when they are defeated in the Legislature, and selecting others who he thinks will be able to command a majority of votes in it.

We see that we may now—though very roughly—class existing civilised governments according to one or other of several principles of division:—

J. Is there one central government with full powers (as in England), or one central government with betatin specified powers, or a number of government width server seem powers for themselves (as in the United States)? In this inster type it is rather a preside to know where the Soverniguty is. The best autherities say it resides in all the governments taken together. This gives us the division into Unitary and Federative States. X is the power (generally speaking) constitution.

tionally in the hands of several authorities, or of one? This will give us Russia in one division, and all other-non-barbarous-States in another. 3. Taking the latter class, is there some one

strang the nature coasts, is never some one person in whom by the Constitution the supreme authority is vested, and who does not derive his power from the people by election? This will give us the division into Monarchies and Republics or Democracies.

4. Is the legislative author ty carefully separated in most of its working from the executive? (It is necessary to say "in most of its working," because used seg-cartion would reach that there is no proper Soveredon in the hards, and then the State would not be a State of all 1 if it is not segterated, we shall have brilledmontage government. If it is, we also have brilledmontage from the state of the

A classification of governments, in fact, can only be by type. There ere two great types (apart from Russin 1-Constitutional Monurchies and Republics. England, he which elements which are partly not elective have a good deal of power (though they generally do not exercise it), is a constitutional monarchy. Switzerland, the United States, and France are republies or democracies, because all the powers possessed by any authority in the State are conferred on it by popular election. As the non-elective authorities in England do not use their powers, the monarchy becomes very bke a demogracy in its practical working. Or the legislative part of the elective muthorities may neglect their duties, or by too weak to perform them, so that the executive part tyrmmises over the people. This often hoppwas in South American democracies. Most of the monerchies of Western Enrope, however, tend to resemble Parliamentary republics in their working : Germany, Austria, and Denmark being excentions, in which the Klug or Emperor not only has rather more power by the Constitution than in Italy or Spain, but really uses some of the powers which cl-ewhere have fallen into disuse.

COMPARATIVE ANATOMY.—XIII. (Continued from p. 188.) VERTEBRATA (continued)

ITEBRATA (continuel).
DIRDS.

This class of the vertebrates, though possessing an external configuration which apparently differs much from all other animals, is closely allied to, and may be considered as a modification of, reptilian type—the two considering a great group, which Husley has called Sauropsida.

The rule that animals are constructed according to their labits and the median in which they live and more is heautifully exemplified in hirds. Their bones are extremely light, and rendered still more so by being, in the unifority of instances, permeated by air. The outer covering, or epidermis, which in

the preceding divisions we have seen variously modifie Lake undergoes a wenderful change, thus contributing to the same end, and exhibiting a characteristic difference from the scale-clad coldblooded animals we have described. The entirle is no longer coverel with scales, but with closely nurregated appendages, or feathers, which closely envelop the body, for the double purpose of maintaining warmth and assisting in airial progression. Each feather is a mechanical wonder. When fully formed, a feather is compased of a central cylinder or quill, by which it is attached to the skin; a shaft, which is the tapering continuation of the quill; and the vane or beard which projects from each side of the shaft. The latter is composed of barbs and builded. The feathers present some variations in size and form in different parts of the body. They are variously coloured, and form the chief feature of ornam ntal beauty of birds. The feathers are formed by the conversion of the cells of the outer layer of the epidermis (skip) into horn-like material.

The Mandible or Hill consists of two portions, formed by the clongated upper and lower maxillary hones, cavered over with a horny sheath, which serves the place of tenth. Besides being a prehensile organ, the bill abls in the musticatory process to a certain extent, and in some birdsc.e., the parrot-assists in chubing, thus ucting as a third foot. It presents many interesting modifications of size and shape--from the filamentous cone of the humming-bird to the huge bill of the tonean. The food, and manner of obtaining it, peculiar to each species, determines the size, shape, and degree of hardness of the bill. Thus it is strong and hook-like in these which tear their prey; short and come at in the grain-enters; probe-shaped in these which live pameipally on insects. In the ibis, the bill is curved down. In the inbirn (Fig. 10, I, c) it is bent in. It is dilated at the extremity in the spoonbill. Ducks, geese, etc., have the bill flattened. In some birds it is dentated. Besides these, there are a variety of shapes, extremely interesting,

The Tangue presents almost an unray penuliarities as the namilible, and, like it, serves for the most part as an organ of prehension. It is composed of muscles, correct within humy shorth, and supported by one or two bony pieces (liyaid opparates) proposed backwards behind the incent (Fig. 10, VL). This lyoid apparates is very remarkable, especially in those birts which that the tongue repully at inseed, not the most opened (Fig. 11, VL). This lyoid apparates is very remarkable, especially included the considerable of the considerable of the tongue repully at the section of the considerable of the considerable of the field of the considerable of the field of the considerable of the field of the considerable of the single it is the sniple it in
long and slender. It is very short in the kingfisher. The tangue of the go se has projecting from its sides a number of recurve) spines. The honey-enters have the extremity of their tongue the giazard. The crop is a temporary reception bar, the food hodging there until the giazard is ready to receive it. It is single, but of large size in the common food (Fig. 40, 11, 4). The pigeon has a

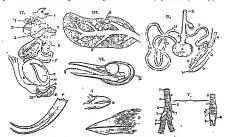


Fig. 40.—1 Bears of (a) Shinke, (b) Crow, and (c) Jabirg. U. Didestive Canal of Comids Figs. 111. Diagram of Loral of Birds-Lifts (1) Februar Oracss of Fourla T Birdfing Season (Owin), Vo. Interior Litures of Hook. VV. Vertical Section of Explance Lainex of Rook. VI. Head of Woodel, Williams Liture of Woodel, Williams Liture of Woodel, which Liture of Woodel, whic

Refs, 10. Sec. 1st Type-11, A public; 2, every 2, parentheraire + 4, girneri + 5, ment in brieflers, 6, conset, 7, lores, birelland, 8, mineris, 76, obstactiv, 16, dones, 11, process of entitionant of volvelous, 116, and the simulation of Secondary, 16, and the public of the simulation of Secondary, 16, and 1

furnished with a tuft of horny, hnit-like flaments. These pecalits rabupes of the tongue are, like the mandilshe, determined by the kind of food, and the method of obtaining it. Benesth the tongue there are a number of small glandular masses, onlied salivary galants. These farmish a gummy-like flaid (quilisa), which molstens the food, in the wood-pickers and other linear-eaters the saliva is visical, to enable them to attrain process.

All mentary Canal — The first portion of the digestive trant, extending from the month to the stomach, is called the guilet. Its length is proportionate with the birds used. It is manly wise, and in some kirds expain of great distension. At the lower part of the neck from numminates with a reactiving cavity, or erop (Fig. 10, II.), where the food remains lodged for a time. A little below the erop there is another distantant, the proventriculus, or escend stomach FFF: 6.0. II.3, an all below this a third.

double copp. In many birds it is wanting, the foot passing along the golfet to the trues connection core, or, as in some birds that swallow whole field, the gallet is distended into a pond-like cavity, serving the purpose of a crop. The preventriculus (Fig. 40, 11, 3) may be assulted to integer than the giranti. Its walls are thickly studied with small follieds caulted gravity chains, which power and the studies of the control of the control of the control of the control of the the girant. The partier glamas are variously arranged, and present some differences in size and shape.

The gizzard, composed of a dense aggregation of mascular fibres, is covered on its intental aspect by a dense skin-like membrane, thus forming a powerful agent for the mechanical reduction of the food. Many birds further increase the power of reduction by swallowing pieces off lint or other hard substances.

The intertinal portion of the aligentary canal retains much of the simple reptilian form. It veries from twice to eight times the length of the body. The first portion of the intestine immediately succeeding the stomach is called the duodenum, ami Is arranged in a characteristic bou-like fold, the interval being occupied by a gland called the panerens, which is similar in structure to the salivary glands. The renaming partion is also more or less folded. and finally terminates in a short tube of greater calibre, called the large intestine. In the manuschin. the large and small intestines are separated by a valuator fold of the reneous linking; in birds, however, there is no such arrangement. The point of terms ination of the one and commencement of the other is marked by one or two ponches called each (Fig.). 40, II., ii), one on each side of the Intestine. They vary in length from a simple off-et, as in the Solan goose, to processes some feet in length, as In the grouse. The interior of the execu of the ostrich is arranged in a spiral manner. The care are wanting in many birds, as the cormorant, wryneck, tonean, some vultures, etc. The large intestine is short, straight, and destinate of folds, and terminates in the closes (Fig. 10, 11, 10). There is an appendage (Fig. 10, 11, 11) connected with the small intesting. the remains of the duct of cummindention between the volk-bog and intestine in the chick. Birds have no complete disphragm or partition muscle separather the thorax from the abdomen; con-conently the liver, which is large and two-lobed, occurres a part of both envities. It has appended to it a gull bladder and a hile-duet. The latter opens into the first part of the small intestine. The spleen is small. The kidneys are large, and ledged along the up er part of the pelvis. From each kidney a tube--the ureter (Fig. 40, II., 8)-passes downwards, terminating in the choica. Birds have no urinary bladder. the urine being voided along with the excrement,

The Repiratory Apparatus.—This causists of an air-tube (the tracher), with an upper and lower largus, two highs, and a number of air-tace variously disposed thronghout the holy. The traches, or wind-plpe, is a cylindrical tube, coinspeed of a number of cartillaginous rings connected together by filtrons membranes. Its length accords with that of the neck of the binh. It is surrounted above, and also below, by a largus. The upper largus is boundeductive in persistion, and in some respect in structure, with the nonunsulian largus, and the property of the

The rings which enter into the formation of the air-tube are not invariably of a uniform dinmeter.

but sometimes present eccentric arrangements, as in the turkey, heron, eagle, etc., mercasing in size from above downwards. Sometimes one or more chamber-like dilatations are found developed upon

The lower larynx is situated upon the inferior extremity of the traches, just before its bifurcation . into the branchi. This complex apparatus will be, best understord by a reference to Fig. 40, V., a, b (after Milne-Edward-). It may be compared to a kind of oscous dram, the interior of which is divided inferiorly by a traversing beam of the same nature, surmounted by a thin semilinar membrane (Fig. 40, V., & 2). This draw communicates inferiods with two apentures of the glottle (rimer glotticis) formed by the termination of the brought, and each provided with two lips, or vocal cords. Finally massles, whose numbers vary, extend between the different rings of which these parts are composed, and move them so as to stretch more or less strongly the membranes they support. In birds which do not modulate the sounds, the meinbranous septum Is wanting. In those which do not sing there are no muscles proper to the inferior laryus. The huge are small and undivided. A subdivision of the trachea (bronchus) enters the laner and lateral aspect of each lung, and after traversing the lung by smaller subdivisions (Fig. 10, III , aa, bb), comnumbrates on their inferior surface, by four or more pairs of orifices, with the nir-sacs of the body. The latter communicate with the interior of the bones. Respiration is thus seen to be a very active and complicated process in birds, and not confined to the lungs, but shared in by every part of the budy where air penetrates.

Treathline.—The temperature of the blood exceeds that of any other vertebrates, ranging on an average from 100° to 143° or 110° Fahr. In sealed, as the gail, the temperature is bover than that of other birds, varying from 100° to 105° Fahr. In the common foul it images from 100° to 110°. In 110°, in 110°, in 110° to 110°, in 110° to 110°, in 110° to 110°, in 110° to 110°, in 110°, in 110° to 110°, in 110° to 110°, in 110° to 110°, in 110°,

The heart is double, each half presiding over a separate system; the right one over the palmonary, the left one over the general or systemic. The main object of the right system is to remove from the blood certomic acid, which results from the waste-tissue products, and replace it with waygen.

Acrous System.—The heath of birds toakes some little advance towards the mammalian character. The cerebral hemispheres are increased in size, and possess traces of convolutions. The gaugha which preside over the sense of taste are small. The outle lobes are large, as might be anticipated from the keen sense of sight and the complete power of adaptation of it, at all distances, which birds possess.

The ecrebellum and spinal cord are both of large size.

The Skeleton .- The skull of birds is made up of a number of bones, separate in the young bird, but which, speedily growing, become inseparably blended together in the adult. The jaws, as already mentioned, are elongated, and both are movable, The lower one is connected to the cranial bones by the intervention of a second one called the quadrate hone. The skull is connected to the vertebral column by means of a single condyle. The vertebras vary in number, the cervical ranging from ten to twenty. The dorsal, lumbar, and sacral vertebue are generally found fused together and immovable. The cocyceal, which support the tail, are movable, The sterman, or breast-bone, is large and expanded, and has projecting in the median line a keel-like ridge, to increase the surface of attachment of the large elevator and depre-sor muscles of the wing, It has connected with it two hones: one small, the furcula, or chylele: the other large and strong, the corneold hone. The latter acts as a powerful fulcrum to the wing, as well as a point of attachment to muscles. The extremity of the bird's wing (hand) merely serves the purpose of a support for feathers. The legs vary considerably in length, according to habits. Euch foot has three or four toes, terminated by claws, and in aquatic birds connected together by an intervening web-this is principally confined to the three anterior toes. The feet and logs are generally covered with borny, scale-like plates, and destitute of feathers. The power of flight which many birds possess is indeed wonderful. The museles in connection with the upper extremity may be said to consist of two classes; one by which great power is obtained; and the other, speed at the expense of power.

Generative System. In their reproduction bills are strictly ordprans. The generality organs exhibit for the most part a close numbery to those or hibit for the most part a close numbery to those of the higher regular. The ownry's more mouse and single, the right with its ordinate being permanently attra-placed, a singular violation of symmetry which is contact to birds. In this class of Vertebrata inculation attain its highest perfection. It appears to arise from the concurrence of these three esigmedies—the necessary life and early naturity of the young, then necessity of warmth to their development, and the incommitality of the roong-cition with fields.

Classification.—Birds are divided by Professor Huxley into three orders:—

 Kaurura.—Distinguished by having a long tail like a lizard. This order contains only the extinct bird, archeopteryx.

2. Hatita.-From their raft-like keelless sterna.

This order comprises ostriches, theas, emo-

 Carinate.—Having the sternum raised into a median ridge or keel. All ordinary birds belong to this order.

ALIAMMALIA

We have described beings adapted to live in water; beings capable of living on land or in water; others that can sour in air far above earth's surface; and now it only remains to describe those animals which constitute the final link in so extensive a scale-and being final, in possession of forms the most beautiful of faculties characterised by the highest degree of intelligence, and of peculiarities which distinguish them from every other division of the great vertebrate kingdom. The chief distinctive peculiarity is that of teats, which nearly all possess, and whence they take their name, the word mammalia coming from the Latin mamma, a text. The preceding divisions are more or less independent of their parents for support. Not so, however, the manmalian young; helpless when born, they would hopelessly perish had not Nature provided the parent with breasts which furnish the secretion milk, and a corresponding degree of affection-the one to nourish, the other to cherish them until sufficiently natured to seek food for themselves. The teats vary somewhat in position and number. In man and the quadrumann they are slunted on the chest; in flesh-enters, over the chest and belly; in the cow, mare, etc., they are placed close to the hind extremilies. They are two in number in the goat, elephant, and ape; four in the horse and cow; eight in the cut; ten in the rabbit and pig; and ten or twelve in the rat. Each milk gland consists of a number of small lobes bound together by connective tissue. Each of the small lobes is nucle up of still smaller ones, and each of these terminates in a small tubo or duct. The duets of the smaller divisions of each lobe join to form a common duct. The ducts so formed terminate at the central projecting part (nipple) of the breast. The chief constituents of the milk are: Caseine, butter, sugar of milk, alkaline and earthy salts, with traces of iron.

The lowest order of coult great classes is represented by beings which particle of the character of the next lowest class, and so we find it here. The Duack-billed Harpes (Ornitior-higherite), a nativo of Australia, has certain features which are essentially belin-like in classester—e.g., it has a bill like that of a duak, veabbed feet, one. It spends much of its time of the control of the con

the percurier ant-eater (Echidae). Both these forms lay exes.

In the next ragge towards mammalian perfection we find on extensive order of animals, principally found in Australia, Tananula, and the islands of the Asinte Archiplago as far as Java. A few species are found also in America. These are the marphila, or penched gradrupoda (long arozo, oposeums, etc.), so named from the presence of a tag, devenued to the properties of the properties of the size of the bully are properties of the properties of

With few exceptions, the mammalia have their skin protected with hair. In colour, shape, and strength, the hairs vary considerably, from the enrly wool which keeps the sheep warm, to the protective spines of the hedgehog. The hair fulfils the following conditions :- Provides warmth to the body, adds to the beauty of the animal, forms a protective covering to the skin, and likewise, as in the timid hedgehog, a spiked coat of mail, a most formidable and invincible barrier to the would-be untagonist. Every hair is divided into a free part. or shaft, with its tapering point, and a root inclosed within a sac. In straight bairs, the former is generally straight and rounded; in the curly and woolly hairs, it is twisted spirally, and quite flat, or slightly ribbed. The root is always straight and cylindrical, and softer and thicker than the shaft; at least, at its lower part. In living hairs it ends in a still softer knob-like enlargement, two to three times thicker than the shaft, the bulb of the hair, which is placed, cap-like, upon a little process of the sac named the hair papilla.

The nulls and claws are like the hairs, modified epidermic processes, and, like it, consist of a soft and a horny layer.

Some animals, as the elephant, hippopotamus, rhinoceros, hog, horse, ass, etc., have remarkably thick skins, and on this account were formerly classed by Cuvier as a distinct order, under the name Panhydenmata (rayfe, thick; \$\delta\text{piga}\$, skin).

METEOROLOGY. - III. (Continued from p. 164.)

THE PRESSURE OF THE ATMOSPHERE. THOUGH the barometer cannot safely be used as a weather glass by the mere observation of how high or how low it is at any one time, as is suggested by the words "change," "thir," "set after," etc., placed

 Plutarch, in his treatise on the love of parents for their children, mentions these animals as an illustration of affection for their offspring. on the dials of anevole's not or they popular forms of the instrument, there me a faw governl rules as to it's beight. It is generally litch:—(1) in very cold wather when the lower strain of air are denser, (2) when the air is dary, and (3) when an upper current sets in forwards its polition. Conversely, the mergary is low in warm or damp weather or the mergary is low in warm or damp weather or shall of a nule.

We thus get permanent high-pressure regions along the line of the tropics, and a low-pressure area along the equator, where the sun's heat produces a constant up-current. This upflow produces the trade-winds (see Vol. I., p. 146), whilst the earth's rotation gives to all winds a tendency ' to be deflected towards the right in the northern, towards the left in the southern hemisphere. The prime source of all movement in the atmosphere is the general temperature circulation set up between the equator and the poles, all wind arising from differences of pressure, the air flowing from a highpressure area to a low-pressure area to restore equilibrium. Just as a river flowing down from its source to its mouth cannot slide straight down the incline like a solid weight on a board, but forms eddies or whirlpools in which the water gyrates downwards, backwaters in which it flows upwards. ripples, and other complex movements, so the air flows in various more or less complex spirals. The earth's rotation, which gives an easterly tendency to northerly winds and a westerly one to southerly ones in the northern hemisphere, will cause these spirals to travel, in that hemisphere, in the same direction as the hands of a watch, when surrounding a region of high pressure. This may be expressed by saying that the wind leaves the point of highest pressure on its right hand. Conversely, the wind flowing out of a region of low pressure circulates (in the northern hemisphere) against watch-hands, or so as to leave the lowest pressure on its left. In the southern hemisphere these conditions are reversed, the wind moving round a low-pressure area with watch-hands and round a high-pressure area against them. Though previously ascertained, this principle is known, from a professor of Utrecht, as Buys-Ballot's Law, and is often stated as follows :-

Southern Law, and it is vicine america is follows—
"In the northern hemisphere, stand with your back to the wind, and the barometer will be lowed to the wind, and the barometer will be lowed to the wind, and the barometer will be lower on your expension of the wind, and the barometer will be lower on your right hand than on your left. Obvoosly, this law may be transposed into :—"If you stand (in the northern hemisphere) with the high barometer on your right and the low on your left, the wind will blow on your back."

Though lines known as isobars joining places having the same average harometric pressure for the year, or for any month in the year, have been for



Fra. 10. Custa.

'a the above clear the dates this case "technes" or have a qual Usum their persons, the ania estitich they rate vite being rates in facins at the end, thus self at the stable to persons be zero in terms for several physics on arrows the with the wind, the force of which is shown to the sample or in this and facilities, there—ye, lake the sample or in the material facilities, there is a proper at the sample of the date of the soar world in equal letter. The 'dender's the winds satisfaction is the

a quarter of a century hard down on map. It is only compositively high that the trade of specific compositively, high plant the trade of specific contentions to the specific communication at small intervals of time, generally daily, giving isolates for every teath of an inch of the learnmeter scale, less shown a close connection of while and weather, not only with the meanness of these course, but also with their slapes. These synchronous chairs are also called spontiae charte, as they enable the mecrorrologist to take a general view of the weather of a whole zore, and, as they may contain, in addition to the isolate, Sochern, arrows macking

the direction and velocity of the wind, and symbols to represent the conditions as to sky, cloud, rain, or snow, they are also known as metogeness. For example, Fig. 10 is the meteogram issued by the Times for January 184, 1892, with the explanation published with it.

The comparison of many thousand meteograms has led to the following generalisations:—"

1. That in general the configuration of the isobars takes one of seven well-defined forms.

 That, independent of the shape of the isobars, the wind always takes a definite direction relative to the trend of these lines, and the position of the nearest are of low pressure.

3. That the velocity of the wind is always nearly

proportional to the closeness of the isobars.

1. That the weather—that is to say, the kind of cloud, rain, for, etc., at my moment depends on the shape, and not on the closeness, of the isobars, some shapes heling as-oclated with good and others with hard weather.

5. That the regions thus mapped out by the foldars are containtly shifting their positions, so that changes of weather are caused by the diffiling a pers of those areas of good or lead weather, also our usuall scale rafu falls us a signall drives by. The motion of these areas is found to follow each, that have, so that forceasting weather-changes becomes a possibility.

6. That habitually in the tropics, and sometimes in the temperate zones, rain may full without any appreciable change in the isobars, though the wind conforms more regularly to the general law of these lines. Such tain is termed "non-isobaric."

The seven fundamental slapes assumed by too-lars, which are, a which are, a we have seen, comparable to the various forms of oddy, backwater, and ripple in a stern of water—are the eyelom, excellare yelom, interpolom, verdge-skaped bolants, straight bolars, versam the life plays, straight bolars, versam the life life in the life of the straight bolars, we will be life in the life of the life of the life in the life of the

The direction of the whal is always along the solar, leaving the lowest pre-soro air is left hand (in the northern bradisphere), but not exactly parallel with the fosher but luclined towards the nearestlow pre-source at an angle between 30° and 40°. The velocity of the wind is modelly proportional to the velocity of the wind is modelly proportional to the sterned the harmouries quadwar, In engineering the same unit of measurement, the foot, is used for

^{*} Hon, Ralph Abereromby, "Weather."

Grown," assisted by a body of Ministers generally chosen from the Legislature, and legislating by giving his consent to laws passed by that body. There are certain recognised principles which dotermine his action and that of the Legislature, The chief of these are somotimes written down in an anthoritative document, in other cases they are simply understood; but as new hittournstances overto precedents, much of the real Constitution is still un written always, even where there is a written The bend of the Statu directs the oxecutive power and the judicial power, delegating the latter, of conrec, to judges of various grades, it heing naderstood that a obcok on his action is socured to the Logislature by the fact that it, or sometimes the Lower House of it, votes the taxes necessary to pay the expenses of govern-ment. Moreover (thunks to the "patriarchal theory" we have before spoken of), the forms of legal we have before spoken of), the forms of legal insugage in use suggest that this bend of the State is the possessor of the legal sovereignty, that the Ministry are only his advisors and the Legislature ils subordinates. In gractice, however, the case is just the rowses. The King may (if he has the ability) excretes a good deal of indisence in the details of government. But on all points of the details of government. But on an points of the first importance it is understood (except in Germany and Austria) that he postpones his own wishes to the advice of his Ministers, and that they, and not he, are responsible to the country for nots do in his name. And the Ministers are selected by the leader of that political party which has a majority in the Legislature (or often in the majority in the Legislature (or often in the Lower House of the Legislature) and can com-mand its support. In fact, "constitutional mon-aroby" is really just the coursers of what it professes to be. The most dignified and preten-tious parts of the Government have the least real power; the King is less important than the Legisintere, and the Upper House of the Legislature is penotically (and usually legally) very much less important than the Lower. But overywhere the important than the Lower. But overywhere the Crown has very considerable powers in reserve, and is a great emergency it may use them.

This constitutional monarchy bas grown up under

This constitutional meanriby bas grown ap under the peculiar circumstances of Anglish bitter, the peculiar circumstances of Anglish bitter, Cabinet as a body of men belonging to the same party—have never been formally exacted in Angliand by statute, und'up not mentioned in official decaments. The power of the Crown has presciedly died down gradually since the Revolution of 1695, the control of the Company of the expense of that of the House of Lords, especially since the Reform Act of 1828. Under the any other Constitution, ours is worked by a number of tacit rstandings which are not all to be found in the standard text-books, and which change from time to time. Thus the Crown never now in England either vetoes a Bill passed by the Legislature, or refuses to assent to the desire of the bulk of the nation when it is unmistakably expressed. "The King reigns, but does not govern." Nor does the Upper House of the Legislature hold out permanently against the expressed desire of the majority of the nation. These anderstandings have more than once saved England from a revolution. Now, at the end of the last century the comparative freedom enjoyed by Englishmen induced Conti nental students to turn their attention to the English Constitution; and after the full of Napoleon, the despotic kings, who were restored in various Buropean countries were induced to grant Constitutions more or less on the English model. But though the forms of the Constitution could be introduced, the political ability which made them workable, and the tacit understandings which made the Government very different from wint it appeared to be, could not; and it can hardly be said that constitutional monarchy has in general been a very decided saccess eatside of England.

There are, however, enormous advantages in thu possession of an hereditary head of the State The good old feeling of loyalty is easily called out by the worthy representative of a great historic royal house. It connot possibly be called our by an elected party leader whose election has very likely been strongly opposed by nearly half the action, and who has probably made bitter enemies in his previous career in politics. The King may exercise an elient inflacuce in social life, and may gain thu love and respect of his subjects in a way that ac elected posident could. Personal respect to a king ensures the submission of many people to the Government who would hardly be capable of comprehending such an abstract idea us that of duty to the Stute. Especially is this the case in a duty to the cities. Expecting a time the citie in a great empire containing a number of politically back-ward peoples, such us those of the British Empire in India. And it is a great udvantage to relieve the State from the turmoil, and it may be the danger, of an exciting presidential election. Moreover, is inevitable that in that election personal scandal-(real or false) should take much too large a place in the minds of the voters.

Now, both the other leading types of callised government at present have spring from the English system, though the rudiments of a similar

system have existed at some time or other in most European countries, but have often been obscured

or destroyed by the growth of so-called patriarchal

of cannas, three feet high and three 'est across the lane, by day, or three lamps on a triangular frame by night. The south come and its corresponding triangle has its point downwards, and indicates the probability of strong winds at first from the southward-stag, from S.E. veering to S. and to N.W. The ward-stag from S.E. veering to S. and to N.W. The come has no point appeared, and brillented stages and the stage of the southward of the south

On weather-charts the direction of the wind is indicated by arrows which fly with the wind, and do not face it as does the vane of a weathercock. The weathercock is the instrument employed to give the direction, and care must be taken that its north point is set to the true, and not to the magnetic, north. We usually only use the eight principal points, out of the 32 points of the compass, in describing wind. The force of the wind may be approximately measured either by a pressure anemometer or by a velocity anemometer. In the first case, a plate of sheet-iron one foot square swings like the signboard of an inn; whilst Robinson's anemometer, the chief form of the latter type, consists of four homispherical cups on the arms of a horizontal cross, rotating a vertical axis, which is connected by gearing to recording apparatus (Fig. 12). The force of the wind is indicated on the chart by the number of barbs and feathers to the arrows.

ENGLISH LITERATURE. -- XVI. [Continued from p. 199.] THE RESTORATION PERIOD: DRYDFN AND THE POSTS.

FROM what we have said in earlier lessons, over renders will be able to realist to some extent the renders will be able to realist to some extent the renders will be able to realist to some extent the convalid of the Partian inflences and the videory of the Court party as the Restoration, and the effect which this change produced upon the literature of the age. Nothing can better above this contrast than a comparison of the obsancer and career of Milton with that of Drydon; Mitton the very type of a Partian poet, Drydon by far the greatest, and precludy the best, among the literary offspring of the Restoration.

John Dryden was born in 1631, of an ancient and honourable family, in the coanty of Northampton. After commencing his education at a school in the neighbourhood of his home, he was removed to Westminster School, then under the government of Westminster School, then under the government of was clered to a scholarship of the school principles was elected to a scholarship of the school of the Cambridge, where he took his bachelor's degree in 1054, though he continued to radied at the university for several years after this time. Dryden then removed to London, having in the mountime become porces-od of a small fortune by the death of his father. His relatives were all of the Paritan party. and Sir Gilbert Pickering, a near kinsman, under whose immediate anspices Dryden entered public life, was a trusted friend and follower of Cromwell, Naturally, therefore, Dryden's first public efforts were upon the same side. The earliest of his poems of any great pretension is his "Heroic Stanzas on the Death of Oliver Cromwell." But Cromwell was dead, and the Restoration soon followed; and Dryden, like many another, abandoned the fallen creed to worship the rising sun. This event, however, brought Dryden no immediate improvement in fortime or circumstances, but the reverse; for the friends upon whose influence and protection he had formerly relied remained faithful to the fallen cause, and Dryden, separated from them, was left to rely upon his own resources. The first-fruits of Dryden's political conversion were two beems-"Astrea Redux," a poem in honour of the King's return, and " A Panegyric on the King on the Occasion of the Coronation." But Dryden had to live by his pen, and he therefore applied himself to that form of literature for which, in the reaction from the spirit of Puritanism, the demand was greatest and the reward surest-the drama. For many years, beginning very soon after the Restoration, he produced, in pursuance of an agreement into which he had entered, three pieces for the stage overy year; and his plays show an inexhaustible variety in subject and character, though they are all alike in the dramatic defects which we shall have to refer to hereafter. Nor was his dillgence in other departments less remarkable, in pociry and in prose alike. In 1670 he was appointed to the office of Poet Laureate, and, unlike the modern holders of the office, became Court poot in reality as well as in name, zealously devoting his great powers to the most servile and indiscriminate flattery of the King and his favourites, and the most violent attacks on all who opposed the party in power. Dryden had been educated among Puritans, but at the Restoration became a rigid Anglican, and wrote one of his greatest poems in defence of the Anglican position. But soon after the accession of James II. he abandoned his old faith and professed himself a Roman Catholic. Of course the honesty of a change of creed so sudden and so opportune has been much impugned; and though we may not be called upon to suspect Dryden of conscious insincerity in this change any more than in any other of his transitions, religious or political, they at least show the absence of that carnestness of purpose and strength of conviction which characterised the preceding

generation, and the want of which marked the age of the Besteration beyond all other periods in our history.

Dryden marned, in 1663, Lady Elizabeth Howard, daughter of the Earl of Rork-line, but the marriage was not a happy one. His literary labours were carried on with mace-sing diligence down to the time of his death. He died of drop-y in the year 1500.

Before speaking in any detail of Dryden's works individually, it may be well to point out what were the leading features of his genius, what qualities as a poet he had, and what he wanted. The power of pathos is wholly absent in him; he neither arouses our sympathics nor touches our pity. He addresses himself to the reason and judgment, not to the passions or emotions of his readers. The dramatic faculty, amin, is very defective in Dryden. He can describe characters with unequalled power and felicity-the satirist's art; but he cannot place them before our eyes living and in action-the dramatic art. But Dryden was a man of immense intelleetual ability, eapable of boing applied with success to almost any task, equally strong in argument and in satire. His observation of the salient points of character was keen, and his judgment in handling every subject with which he dealt admirable. But his greatest gift-that in which he specially excels alone among poets-is his power of expression, style, and versification. His language is everywhere a perfect model of English style-clear, simple. nervous, full of variety and of dignity. In every line there is a force and elevation rarely attained by any other poet, the namistakable presence of the ris dicinior of the Latin poet. His verse has been the admiration of each succeeding generation.

From what we have said, it will easily be believed that Dryden's plays are not the works on which his fame should be rested. They are brilliant frequently, with plenty of variety of indient, and the versification (for his plays are, for the most part, in regular rijmed verses) is admirable. When they were produced, they enjoyed an unbounded popularity. But that was an age in which Shatespears was the produced of the produced of the produced by the produced of the produced by the produced because. And to a souther that Durant belower. But their number is an extraordinary evidence of the unwarded diligence of their number.

The second class of Dyden's works consists of poons in honour of public persons or public events. Some of this elises, those addressed to Cromwell and to Clantes II., we have already mentioned; but the most remarkeble of such poems is the "Annus Mirabilis," the first in point of date of his more ambitious poems. Its subjects are the Great Fire

of London, and centain success—animed by the English fleet in the Datch War. beth Expending in the year 160%; hence maned by the pact "Annua Mirabils". The poem consists of more than three lundred staums of four lines each, the lines being the explained lines rhynning alternately. This was a favourtemetre in Dryden's day, but it is one that warder the car, and is peculiarly ill-smitted for the purposes of marative. Indeed, the "Annes Mirabilis" is, on the whole, one of the least pleaning of its author's works; and it is deformed by occasional purpose and proposed in the competition of the control of the control of the competition of the control of the control of the competition of the control of the control of the conpetition of the control of the conpetition of the control of the control of the conpetition of the control of the control of the conpetition of the control of the control of the conpetition of the control of

The next class of Dryden's works which we have to consider are his satires; and in them we find his genins displayed in its highest execulence. The most important of these are of the nature of political satires, written in the interest of the King. and an favour of the Duke of York's succession to the throne, in opposition to the party which called itself the Protestant party, led by the ambitious and unserupulous Earl of Shaftesbury, and whose nominal rallying-point was the unfortunate Duke of Monmouth, natural son of the King. The first and most successful of these satires is the first part of "Absolom and Achitophel." This work was published in 1681, and published with the view of produeing a specific effect noon the public mind. The anti-Popish feeling of the country was very strong. It had shown itself especially in the horrible cruelties. the murders of innocent men in the name of justice, which arose out of the so-called Popish Plot-a plot which was mainly, at all events, the creation of popular alarm and excitement deliberately stimulated by the party of Shaftesbury for their own selfish end. And the friends of genuine liberty, ; alarmed at the violence of the King, were to a great extent driven to support Shaftesbury. But the tide had somewhat begun to turn; and Shaftesbury himself was in the Tower under a charge of treason. At this juncture Dryden produced his satire in the hope of exciting popular ill-will against him, and so securing his ruin. Under the guise of the Seriptural story of David and his rebellious son, Absalom, he presents to us the history of the moment. The too indulgent David is the King himself. Absalom stands for the beautiful, weak, and ungrateful Monmouth; Achitophel, the crafty and faithless counsellor, for Shaftesbury: while the minor characters of the Seripture story have all their counterparts in the modern history. The satire is one of the finest in the language; its populiar merit consists in the extraordinarily powerful portraits it . contains of the chief characters.

This satire was a great success, and its fauncianmediate. Last Shafteshurp, nevertheless, escaped, for the grantl jury of London rejected the indistment against limit and his admires sturk and distributed a needd in bounared the execut. This gave recasion to mather statire from the part of the Contract "The Modal" is semesty is sponerful than its predecess—that his stay different in the and manner. The cool dissertion of character which we find in "Maschan and Achipolar" is replaced by shelent, even strage attack. It is an orabulant mars shaft shaft shaft shaft shaft shaft shaft shaft probability of the shaft probability and shaft
Assembly part of "Absalom and Achitophel" was published the next year; it is not, however, for the most part the work of Dryden, but of a very infector hand, and has little of the power of the first part.

"MacPlochnos" is a sulfar of a vity different class. Bythen III he must of the wist of his day, as well as of the periods which percelled and ultimately followed his time, was shawy in the "ct of controvery, and always at war with that writers and therean near he "MacPlocheos" be intended to inflict summay congrance up or Shadwell, a second-rate pset, with a know Dycheon was constantly at at war. The safter is very fullfaint, very severe, and very unjust.

The next class of Dryden's writings of which we have to specific mosts of his points or controver and subjects. Of these the next map stant (we are the "Religio Lener," written by Dryden while still a Protestant, in defence of the Anglican Clauch; and "The Hind and the Pantber," written after his conversion to the Rosem Catholic religion, in defence of the Church of Bone. The first of these names. in the form of an epistle, contains an elaborate argament in favour of the nutbor's then resition. In point of expression, and the religioidely adapt stam of style and versification to the subject-matter, it is almost without a rival among rooms of its class. The effect of " The Hard and the Ponther" is notice. spoiled, notwithstanding its many beauties, by its half-allegorical form

A very lack place cannor. Depoler's perms must be awarded to like olse, Off all the lyfric in our language of the more mobilions, the heroic or Philotare kind, Dydoch special of our "Alexander's Festal" is the finest. It was written in the year 1637, and, Hes her 5 the for St. Cevilia's Day," and some other well-known olse by other authors, was written for the maseled festival them animally held on St. Cecilia's Day. Depoler's extraordinary concept and victor of sight was preceively satisfied for energy and victor of sight was preceively satisfied for folly for the Miller of the depole of the property of the folly in the Philotatic not then the little space for

Dryden's "Fables," many of which are from

Chancer, are gither adaptations in modern language of some of the "Canterbury Tales," or original tales in imitation of Chancer. As poecus they are pleasing; but they are not Chancer either in spirit or in stale.

Depoin's translations consist of the whole of Veryil, several of the Sulfree of Jaccual, and some of Osific Epistes. His parse works are entirely critical, the prost important being an "Posay on Damatic Posty." They are distinguished for the most part by admirable good sense and judenced in their criticals, and belong by a style manly and viscous, the counterpart fut prose of Depolar's name of investigations.

Of pers sides than demants, there is now but bryton, in this are of the Best-anthon, worthy of any podonic d nides. Portry was the fusion; and dilettant indo hear in mankers, write perty to which their analysis or monetarny prominence. We hills school belonged Best-ommon, Rochester, Barkierkhan, and also Boeste. Some, like kit Charles-Solley, write arreaful and Broyley same. Petryler Solley, write arreaful and Broyley same, Petryler in the state of the solling and produced the period of the solling and the solling of humon Hillips, a most-heed or joe was the siling of humon Hillips. A most-heed or joe was the

THE DUAMATISTS AND PROSE WRITERS.

Turner to the druma, in tragedy the highest place mast be assigned to the unfortunate Otway. Thomas Otway was a man of good hirth and education, but his career, varied as it was in its incidents. was one unbroken succession of misfortunes and distresses, and he died at last in the nest object worst and misery in 1685, when only thirty-four years of age. The best of his tragedies, and those mean which his fome now exclusively rests, are The Opplace and Tentor Property. These plays show that Otway possessed the power of pathos, and the power of moving our sympathies, in a very rare degree. His concertions of character are powerful, if not always yery natural, and his style is vigorous and elevated. In his comelles, of which he left a considerable number, Otway's genius shows to far less advantage. His true domain was travedy, and tragedy of the sublest and most pathetic kind.

Surhaniel Lee was ulso a writer of much tragic power, though the hough all his plays there runs a coin of a kind of strange wibbness, which may be explained by the toulency to inscuity which no more than one coension during his His because developed into actual modiess. The best known of his players in the History Queens or, disconder

Thomas Southerne and Nicholas Rowe may be conveniently mentioned here as belonging to the

both the vertical and horizontal scales in a gradient; thus, a gradient of one in sixty implies a slope rising one foot in sixty. In meteorology, however,

of a system of spiral movement shifts its position These two movements are as independent as are the rate of movement of the cartle round the sun and that of the sun itself through space.

The force and velocity of the wind is estimated according to the Beaufort scale, devised by Admiral Sir Francis Beaufort in 1805, which, omitting its purely naut-



into which science the term was introduced by

Mr. Thomas Sterenson, the unit of the horizontal scale ie 15 nautical miles and that of the vertical scale one-hundredth of an inch of the barometer. Thus, a gradient of 2 means a difference of 0-02 in, hetween isobars fifteen miles apart.

Fig. 11.-Stonm Walkings

This would give a fresh breeze. The gradient is measured at right angles to the isobars, just as we measure the slope of a bill at right angles to two contour lines. Gra-dients seldom exceed four or five in Britain, and may be said to be moderate when below one and steep when above two. As, on the Continent, a degree of sixty geographical miles, and a millimètre, which is nearly equal to 004 of an inob, are taken as stand ards of measurement, their gradients are almost identical with ours.

THE MOVEMENTS OF THE ATMOSPHERE: HOW THEY ARE OAUSED BY CHANGES OF PRESSURE, AND HOW THEY PRODUCE CHANGES OF WEATHER. The movements of the atmosphere are

familiar to us as winds, and though, as we have seen, their direction on a large scale is generally spiral, over smaller areas we commonly consider winds as blowing in straight lines. The distinction must be clearly horne in mind between the velocity of the wind, or its rate of motion in the spiral, and the velocity of a storm, or the rate at which the centre

Of these velocities, 6 is the lowest number taken to justify the issue of warnings to the coast hy our Meteorological Office, and 9 the lowest allowed by the Board of Trade to be pleaded as "stress of weather." These velocities are not supposed to be uniform, 48 miles an hour



eaning 48 miles in the hour, allowing for violent gusts and lulls. The prohability of strong wind is dicated at coast stations by the hoisting of a cone

1678. He become an actor; then 16rt the stage and served in the army; and finally returned to the stage, and become entirest as a coule dramatist. His plays are chiefly distinguished by the variety and treat to nature of the characters which they introduce, and the tonches of humour which constantly recur in the course of them. The most popular of his places is The Deart Strington, Maryland Giel ently, in great want, in 1707.

The most emission, however, of the considerametties.

of this period was William Congreve. He was born in Ireland, though of English parents, in 1670. He received his education at Trinity College, and it is evident that he enjoyed a far more systematic training than most of his brother dramatists. He early settled in London; and his qualities being exactly such as best justified him for social and literary success in the period at which he lived. he very soon acculred a leading position among the wits, authors, and mon of fashion of the day. Few men have been so uniformly successful as Congreve. In his early youth his criticism was respectfully sought by Dryden, then in the very zenith of his fame. In later life he was honoured by Pone with the dedication to him of his "Homer." Among the wits Congrove was supreme; in fashionable society he was irresistible. He was always prosperous in his circumstances, always enjoyed comfortable appointments under the State, and among the comic dramatists he was the acknowledged leader. His plots are not as carefully or skilfully constructed as those of many of his contemporaries: but his clurractors are admirably portrayed, and if not as fresh are at least as lifelike as those of any of the comic dramatists. The qualities, however, in which he stands suprome are the brillinney of his dinlogue, his mastery of language, and the unfulling flow of his wit. The best of Congreve's plays nro The Old Backelor and Love for Lore. Congrovo lived till 1729, but ho had retired from the dramatic art many years before his death. In his own day Congreve was not less famous as a tragic writer and as a poet than on the comic stage : but his somewhat pompous and artificial trugic style has little charm for modern readers,

Few men of his nge played a more prominent part in the history of his country than Edward Hyde, Barl of Clarendon · As a member of the House of Commons, he bure his larme in the contests between the King and the Commons in the Long Parliament. He was at first a supporter, though a moderate one, of the popular cause; but he stimentely joined the King, and after the death of Charles I he became the faithful friend and comrelated in the common that the control of the common that the selection of the common that the control of the common that the selection of the common that the control of the control of the common that the control of t long years of exile, and undergoing with him all the trials and privations of those gloony years for the Royalist party. Hydo returned with his master from exile, became Lord Chancellor and Eart of Clarondon, and for some years was one of the most indusentin und probably the "wises of the King" advisers. His daughter married the Dake of York, afterwards James III, and he thrue became futher-in-law of one king, and gramifather of two successive queens. But Chreadon's favor with the King declined, while his unpopularity with the peòple-in-creased, and, being imponched, he chose to resign listaself to voluntary exile, and passed the remainder of his life abroad. He did in 1000 III life to what is the contract of the life abroad. He did in 1000 III life to what III life the III life abroad. He did in 1000 III life to what III life the III life abroad. He did in 1000 III life to what III life the III life abroad. He did in 1000 III life to what III life the III life abroad.

In the history of English literature Clarendon Is entitled to a high place in virtue of his "History of the Great Rebellion." Histories may generally be divided into two classes. There are historics written by eye-witnesses, who describe what they themselves have seen and known; these, for the most part, derive their whole value from the personal knowledge of the writer, and have soldom any claim to philosophical or literary merit. There are histories writton by men of philosophical mind, of calm impartiality, judgment, and discernment, and with the graces of literary style. But it is one of the rarest things in the history of literature to find the merits of these two kinds of history combined. as they are in a very high degree in Clarendon's history. He writes of the events of his own times. ovents all occurring under his own oves, and in which he himself took an active part. But, though his history is undoubtedly very partial, he vet writes also with much of that calm judgment upon men and things, and that jusight late character. which belong to the philosophical historian; and " his style, though not n model of English writing, is manly and dignified.

Izank Walton was born in 1593. He passed the netive years of his life in the exercise of the trade of a linendraper in London; but having at a comparatively early age acquired a moderate competence, he retired from business, and passed the last forty years of his long life in retirement in the country, enjoying the society of his many accomplished friends, his books, and his fishing. Ho died in 1683. His works are his "Lives," and his treatise on fishing, "The Complete Angler." The lives which he wrote are those of Donne, the celebrated satirist and Dean of St. Paul's, Sir Henry Wotton, Hooker, George Herbert, and Bishop Sandcrson. Few books in the language are more attractive than these exquisitely written biographies. "The Complete Angler" is a book unlike any other ever written. It is, like its author,'a quaint mixture of ardent enthusiasm on the one subject of angling,

same dramatic onbool with those of whom we have spoken, though both of them in the more active period of their lives were contemporaries rather of Pope than of Dryden. Fow plays appear to have enjoyed a more genuine popularity than Southerne's tragedy of Orosando. Rowe was one of the most prominent of the men of letters of his time; he edited the plays of Shakespeare, and filled the office of Post Laurente. Of his plays the most successful were Jane Shere and The Fair Penitant, the latter of which is founded upon Massinger's Fatal

Far more characteristic, however, than its impic singe is the comic drams of the Restoration. It is in it for more than in any other hranch of literature that we find the whole spirit and temper of the Restoration reflected—its lightness and galety, the Restoration reflected—its lightness and galety, its inter want of carnestness or estime purpose, its liceationenes, its rebellion ogainst nil ruics savooring of Puritan mosterity, its foreign testes and aympathies. Its immorality is not like that which we find in so many of the Blimbethan comedies—that grossness of thought and capression, that coarse animalism which always b sion, the course animalism which inverse occupy to an inge of great force and energy, but little refinement. The immortality of the Restoration drams lies for deeper, and indicates a very different tope and spirit in society. It is the immortality of an age and closs which knows no object worthy of nu age and closs which knows no outer pursuit but pleasure, which not only ignores hut despises every higher principle, every noble and, and every more serious or enmest pursuit. This is a spirit which has seldom been of oil prevulent in a spure which has seldom been of oil previlent in English society. And this has goof far to prevent the comedies of the Restoration retaining with pos-ierity anything like the favour which they enjoyed in their own day; and in the present day its sheer indecency prevents its reproduction on the stage. manowiny prevents its reproduction on the stage. But we should convey a very false impression if we led our readers to suppose that the dramatists of the Restoration awad their success to their immorality or their frivelity. In their faults they reflected the world they lived ln. Their genius was their own, and the greatest among them were men of rare comic genius. The plays are full of the most humorous delineations of character, ore inexhaustible in variety of mausing intrigues and incident, and sparkle with the highest wit. The school of dramatists of which we ere now

speaking first became prominent immediately after the Restoration, and was distinctly its product, and for this reason we speak of it os belonging to this period. But it must be remembered that several of these dramatists, including the most distinguished of them all, lived to see the final fall of the House of Stuart and the necession of William III. The 185

earliest of the dramatists of this class was Sir George Etherege, a man who presented a fair type of the cavalier in the days of his prosperity. His comedies are umusing, but their fam quite colipsed by his more distinguished seccessors. m Wycherley was born in 1640, of a good

family. He was educated in France, and return to Eugland when the exiled cavaliers were turning to enjoy their triumph there after the 'Restoration. He soon became the most popular of dramutists, though by no means the most profife. Nor was he less successful in society then on the stage, his hrilliant wit, courtly manners, and handsome person securing him an enviable position at the may Court of Charles II. Bot with him as with most others of his type, Court favour proved uneertain and pleasure passed with youth; he fell into werty, parchased his release from went of James poverty, purchased his release from went of James II. at the useal price, by turning Rommo Catholio in chedience to the royal command, and died in ch-cority. His plays show in a very high degree time resource and fernility of invention, that brilliancy and brightness which are choracteristic of the class of dramatists to which be belonged; but in point of morality nothing can he more debused. been not unfairly described us "the most licentious and hard-bearted of a singularly Reentions and hard-hearted solvol." The hest of his plays are The Country Wife and The Plain Dealer.
Sir John Vanbrugh was horn by 1606, being the
son of a wealthy cognr-baker in Loudon. The

family was originally Datch, and was one of the many which settled in England during the personstion of the Protesseuts under the Dake of Alvo. Of Vaubrugh's education and early life very little is known; but he seems to have served for ser time as a soldier abroad. In leter life he held positions of some dignity in the Hemida' Coilege, and for his services of this nature was knighted by George I. But his real fame rests upon his dis-tineties in the two orts of orchitecture and the drame. As an architect he ocquired the bighest reputation, though his productions, of which Blenkeim Palace is the most important, have been very variously judged by modern critics. As a comic dramatha his merits are very great. His characters are drawn with cingular freshness and elecand the conduct of his plots is admirable. Of his five comedies the best known is perhaps The Provided Wife. Living as Vanbrugh did, later than Wycherley, and writing under the more whole-some believeness prevalent after the Revolution of 1688, his plays, ut least the later ones, are by no means so grossly immoral as those of his prede-cessor. Yanbrugh died in 1726. George Farquhar was horn at Londonderry in

bottom of the vessel. These, as they fall, will absorb so much heat as to freeze tubes in the water, down which the mercury will run.

When n heated body has to be handled, some nonconducting material is usually interposed between it and the hand, so as to guard against burns. Thus in most teapots an ivory ring is let into the handle, for the sake of keeping it cool. Many apparently strange phenomena may be explained in this way. A kettle, for instance, that has been used some time. and become coated with fur outside, may be taken off the fire and placed with impunity on the naked palm, even though the water be boiling in it. The fur is a non-conducting material, and protects the hand from the heat.

A red-hot poker likewise may be safely struck with the hand. This partly arises from the fact that a quick blow does not allow time for the metal to burn the hand, and partly from the fact that the moisture of the hand is converted into vapour, and prevents ab-olute contact with the heated iron. Some remarkable phenomena have been observed which illustrate this fact. If we take a silver vessel, and having raised it to a temperature a little above 2120 F., immerse it in a vessel of water, it will hiss from the sudden conversion of the water into steam, and will specifily be cooled down. If, however, we heat the ves-el to redness, and place it on the surface of water, no effect will at first be produced. It will quietly float for a time without any sound being heard. After a while, however, a cloud of steam will suddenly be produced, and the usual hissing noise will be heard. A similar thing occurs if a highly heated silver weight be dipped into a vessel of wrter.

The reason of these apparently strange phenomena is that as soon as the heated metal touches the water, that portion which is nearest to it becomes suddenly converted into steam, and this keeps the silver from contact with the water, A layer of vapour is, in fact, interposed, which prevents actual contact. When, however, the silver is cooled down nearly to the temperature of hoiling water, the separation ceases to exist, and the water comes in contact with the silver and cools it.

These effects were first observed by Leidenfrost, but have since been carefully investigated by others. A simple way of showing them is to take a platimim or silver dish, and having placed a spirit-lamp under it so as to beat it to redness, drop with a nine a little water into it. The liquid does not spread itself out and moisten the dish as it would at ordinary temperatures, but at once assumes a globular form. and rotates rapidly. Its evaporation, too, is very much less rapid than it would be if it boiled. and its temperature is always below the boiling point. The liquid is said to have assumed the suberoidal state, and will remain in this condition if the source of heat is kept under the dish. If, however, it be removed, the heat will gradually diminish, till it is no longer sufficient to maintain the globule in the spheroidal state, and then the liquid will touch the metal, and be immediately thrown into a state of violent coullition, a large amount of steam being given off.

A remarkable experiment is sometimes tried which will illustrate this fact very clearly. The performer procures a largo melting-pot containing several pounds of lead, and places it over a fire until the lead is not only melted, but quite redhot. Having washed one hand so as to free it from grease, he dips it into a vessel containing strong liquor aumonhe, and then pinnges it into the molten metal, or ladles out the lead with it, without any danger. The only sensation produced is one of cold. This experiment is one which few have the courage to attempt, but it is perfectly safe. 'The heat of the metal ovaporates the liquid and drives out the ammoniacal gas from it, and thus the hand is entirely enveloped in a glove of vapour, which prevents contact with the lead. The cold felt arises from the rapid evaporation. In performing this experiment it is very im-

portant to have the lead red-hot, as otherwise it may come in contact with the hand, and a severo burn is then produced.

CONVECTION.

After conduction, the next mode in which heat is transmitted is by conrection, or the setting up : of currents in the liquid or gas to be heated. By this means each particle in succession is directly

Fig. 28.

exposed to the source of heat, and thus has its temperature raised,

There are several ways in which convection may be illustrated-one of the best is to take a glass vessel filled with water (Fig. 28), and having dropped in a few fragments of litmus, cochineal, or permanganate of potash, place a spirit-lamp under it, and watch the liquid. A stream will begin to rise directly over the lnmp, its course being clearly shown by the coloured particles. This stream will rise to the top of the vessel, where it will spread out and form a down current at the sides, and in this way all the liquid will in turn be exposed to the heat.

HEAT. 261

Another way in which this circulation may be shown is represented in Fig. 29. Two glass inbesare but as there shown the lower one being filled

with coloured water; the other is filled with clear water, and is inverted into the furmed-larged ends of the furmed-larged calls of the furmed-larged calls of the larged in that limbs will at once legin to rise, and to come the larged calls of t

hot-water apparatus freuently employed for warming large buildings is constructed (Fig. 30). A furnace and boiler are

placed at the lower part of the building. From this a pipe, xr. passes to a cistern, o, at the rop. provided with a safety-

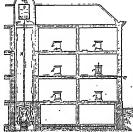


Fig. 20.

valve, n_i : and from if pipes lead to the stoves, a_i , b_i , c_i , d_i , b_i , the various cross. The vertex traverses these on its way back to the boiler, and gives up to them much of its heat. The value heated by the furnace becomes, of course, specifically lighter, and hence rises, while that which has occlosed by its piaseage through the pipes descents, and in this way on constant electration is maintained.

and in this way a constant circulation is maintained.

Gases as well as liquids are heated by convection.

The trade-winds are grand natural illustrations of
this fact: the air having become heated by contact.

with the surface of the certir in tropical regions, expands, and rises, making way for the currents of colder ali from the temperate rones. In the higher regions of the atmosphere a current usually sets in the contarry direction to that on the certific surface, and thus forms the return current. Land and sen breezes are further examilifications of the same fact.

RADIATION.

The third way in which heat is communicated from one body to mother is by means of realisation. In conduction and convection the particles of matter to be leasted where its neight into close contact with the source of freet was chall now find, however, that the source of the set was chall now find, however, that constant contact, and even without altering 4 the comparature of the medium through which it posses. A striking fluidstration of the latter fact is seen in the experiment of setting light to various substances by condensing the same may not them through a long of its. The least present intrough a tin sufficient on the same of the same way of the same wa

When we stand a little distance from a flow we to none experience a sensation of warmth; no particles of matter appear to pass, and yet the influence of the fire is felt. Bays of lent are given off by the burning fact, which create in us the feeling of warmth. The pre-suce of the air se colonity not nocessary for their passage, since we experience the least of the sun, whose mys mush pass through space. We may also prove this fact experimentally powerful battery inculturlers are climated exoctive. Rays of heat will be given off deepite the absence of the air, and their presence will at once be felt.

· ·

ANDANT HIAT AND LIGHT CONFARABLE.

Now we find that radiants heat obeys the same

and the same of the same of the same

directions, and, in n uniform medium, always
travelling in straight lines. This may easily be
shown by suspending a heated body in the air,
and then hedding a thermo-electric pile at equal
distances on cach side of it. If, however, a
plate, of metal, be interposed between the pile and
the source of heat, the rays will at once be intercepted, and the needle will return to zero. The
power of radiant heat diministics, as in the case of
light, inversely with the square of the distance.

(See lessons on Léght, Vol. VII.p., 178).

If we take a licated body, such as a onbical vessel, M, filled with boiling water (Fig. 31), and place it in front of a concave mirror, we shall find that the rays of heat are reflected from its surface, in the same way as-those of light are. Let a with great delicatey of taste, love of nature, keen observation, and n loving tenderness of spirit. The style nod language, in their qualut simplicity, are quite in keeping with the subject.

But of the prose writers of this uge none is com-parable in genius with Bunyan. John Banyan was born in 1628. He was born in the very lowest rank of society, for his father was a tinker, and he himself in early life followed the same trade. Bunyan therefore enjoyed as sensity opportunities of education as it is possible to imagine; no great writer indeed ever owed less to external aids than he did. For some years he served in the army, probably of the king, during the Civil War; but having received strong religious convictions, he abandoned the army and became a preacher, attaching himself to the sect of the Baptists. He pursued his mission with that zenl and deventness which showed themselves in all iso dki, and became singularly powerful and popular as a prenciser; but the Restoution, and the per-secution of all Dissenters which followed it. Interrapted his careor. He was thrown into Bedford gool for the offence of preaching and praying in his own way, and there spent no less than twelve yours At the end of that time be was released, and resumed his old calling of a preacher. He died in 1688. Besides numerous tracts and other less important treatises, Bunyan was the author of three remerkable works. His " Grace Abounding in the Chief of Staners" is a confession or autobiography, a history of the changes in his own heart oud life through which he was led from the state which he afterwards portrayed under the image of the City of Destruction to that in which we see him in his inter life. As a labtory of a great and notable character, told with perfect candonr and wonderful power, it is a book of supreme interest.

But Bunyan's greatest work is the "Pilgrim's Progress." Probably no book in the English languago, certainly no prose work, has ever had anything like the same kind and degree of populority with this. For all classes and ages, during two centuries, wherever the English language is spoken, this book has been found to hove an irresistible charm. And it owes its power not to the peculiar religious views of its nuthor-for when read with care it will be found very unsecturiannor to the logenuity of the nilegory, though this is very great. Its special power lies in the breadth. simplicity, and directness of its teaching, and, above all, in the force of smales which pervedes every page of it, showing itself now in portraying the anguish and conflict of the human heart, now in the keen appreciation and sweetest description of the loveliness of unture, now in passages of infinite tenderness and pathos. Allegory though it be, there are few stories which, merely as atories; have anything like the absorbing interest of the "Pilgrim's Progress." Its style is perfect in its purity and simplicity.

and snapsents.

The "Holy War" is an allegory of something the same class as the "Pilgrim's Progress," but is much inferior in power and laterest.

HEAT.—IV. (Continued from p. 213.) CONDUCTION OF HEAT (continued).

THAT important invention, the safety-lamp, depends for its action on the conducting power of the metals. The lamp is cutrely surrounded by a sinche composed of wire game. As the finane attempts to pass through the game, its best is conducted may, and it is no longer able to ignite the

explosive gases outside.

The mode in which the metal conducts the heat may will be easily seen by taking a cylinder, one end of which, a (Fig. 27), is
composed of wood, while the

composed of wood, while the other end is of metal. It now we wind a piece of paper round this, and hold it in the finne of a spiric-lamp, the paper over the wooden part

of a spirit-linany, the paper over the wooden part will be charred, while that over the others and will nearly be anothed, the metal undermenth baving sometimes of the part of the part of the part of the society the pure. This sho copinin how a busiler may be motived in a piece of writing-super. The paper must be wrapped smoothly round it, and the flame allowed to play only on the part in consiste with the lead. The motel will, of course, burn with the lead. The motel will, of course, burn through the paper os soon as it is melted, but up to this time, the best is all employed in melting. Will

load, and it thus loops every from the proper.

If we take a few falkes of stells few their presence as described in our last issues, and pleas the stell stell stells are stell stells as the stell stells are stell stells as the stell stells are stell stells as the stell stells are stell stell stells are stell stell stell stells are stell stell stells are stell stell stells are stell stell stells are stell stell stell stell stell stells are stell stell stell stells are stell stel

HEAT. 265

When the rays of best fall upon any substance, they are duided into three parts. One portion is redected from the surface, according to the laws strendy mentioned; a second part is irregularly -rattered, and is known as diffused heat. This corresponds to the light which is irregularly reflected from any substance, and renders it visible. The third portion is absorbed by the substance, and raises its temperature. When a number of surfaces are exposed thus to the rays from a heated body, their absorbing powers will be found to differ very greatly, in some cases nearly all the heat being district I, while in others by far the greater portion is reflected. These two amounts will, as a rule, be inversely proportional, the best reflectors being the worst absorbers, and rice rerei.

GOOD ANSORDERS. GOOD BADDATORS. The absorbing power, likewise, by last equal to the radiating power; they appear to bu, in face, almost agreemy more terms. The difference cursed in the absorbing power by the nature of the absorbing power by the nature of the control of a differential theranometer; the rays, as they have already passed through the glass leaves and through a stratum of air, will import to heat to the thermometer, which will remain manufacted. If now we lay a little control of the c

other limb,

Many common practices can easily be explained by notificing the different absorbing and radiumly powers of various sub-lances. A dish-lecover or metal tanget is kept as bright as possible, or as to grewent theorem of the heat by radiation; a black cartherware teapt, on the other land, has a daily and dark surfaces, so that if may be placed on the both and absorb the heat. So, to, if a skelle is of intent quickly, the part exposed to the first should be covered with far and sont, to absorb the heat if the other part should be height, to present the natiation. These things, the namy valuals overs, were known that the namy valuals overs, were known to the content of the namy valuals overs, were known. Int. sections now shown as how to excess if or the content of the name valuals or the name valuals of the name valuals.

The laws of radiation likewise account for the deposition of down sight. The air's then cooler than the surface of the earth, and the latter accordingly radiates its heat into space. These bodies, therefore, which are the best radiators therefore, which are the best radiators become cool move rapidly, and therefore condense tenome cool move rapidly, and therefore condense freely, and hence become coated with dew, while a smooth road reamins almost dry. Chouds, to a great extent, prevent this radiation and bence the dew all be most plential of an along and bence the dew all be most plential of an along and cloud and cloudless mattin. A very thin layer of calito or mutting is likewise sufficient in related mulation, and for this reconstruction is often place a ceeding and for this reconstruction of from higher lyst cold. When the temperature of the ground is very low the dew freezes as it is deposited, and curristitutes form-frost.

THANSMISSION OF RADIAST HEAT.

When exprimenting with radiant heat, we find, as already referred to, that sub-tances differgreatly in the amount of heat they allow to pass through them. This may easily be teased by the arrangement shown in Fig. 3t. A serven, it, is turned between the source of heat, A, and the themselved the substitution of the

only those which pass in a straight line through the

uperture c can reach the rule. Under c is a small



shelf, on which we can place the bodies to be tested. A glass cell filled with his alphide of carbon, and placed there, will allow about 63 per cent, of the rays to pass, while, if filled with water, it will only allow 11 per cent,; other hquids may also be tried.

Among salids, rock-salt is the substance most transparent to bent, useful allows about 92 per cent, of the mystopass. With most sub-tances the amount of heat transmitted varies with the nature of the source of heat, the heat from a coil of heaudescent pluthum wire, for instance, having a greater penttraling power than that from a plute of copper art 7509.

We must, however, leave the student to pursue these studies further, the object of these lesson—to give a general insight fato the main facts of the seience of little-lawing been accomplished. With what we lawe here dettl with, he will be able to account for many of the ordinary phenomena he meets with in every-day life, and where no explant ion sattifactority suggests itself new lines of inquiry will arise which will require the aid of more advanced works on the subject. Given the spirit of inquiry thus, celled forth he may eventually explore the whole domain of lusal.

ARCHITECTURE—XIV. [Continued from p. 202.]

THE ENGLISH RENAISSANCE (continuol).

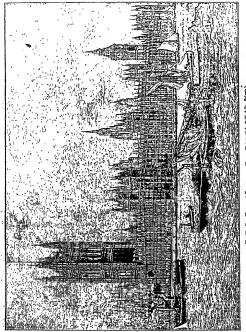
The versatility of Wren's genius is nowhere better shown than in the numerous churches which he was called upon to build in the City; there are of St. Stephen, Walbrook, a design in which the dome forms virtually the body of the church. Wren also may be said to have been the originator of a type of tower and spire which, based on Gothic design, is worked out with classic details. The steeples of Bow Church, St. Bride's, Fleet Street, St. Dunstau in the East, St. Michael's, Cornhill, and . .



at least thirty of them, and no two of them are quite similar. The sites given him were sometimes small and irregular, but he seems to have been able in all cases to suggest an arrangement which should accord with the requirements of the church and yet be dignified in design. The vaults which he threw over the interiors are unfortunately for the most part in lath and plaster, but their forms are based on those of the Roman thermae, or baths-domes and semidomes, octagons, barrel-vaults and intersecting vaults of every description, always presenting the solution of the problem in a new way and giving a variety of effect which is generally pleasing. Where he fails is in the quality of the detail, which must in many cases have been left to the sculptors and plasterers who worked under his control and the vernacular style of the period was not of a very high standard in that material. In those works where stone was employed, as in St. Paul's, there is a vigour in the mouldings and detail which in contrast with later work was remarkably pure in design. One of his most successful interiors is the church St. Magnus's Church, London Bridge, all show various methods of dealing with this feature, and . they constitute now the most picturesque features of the City.

One of Wren's earliest secular works was the Sheldonian Theatre at Oxford, in the roof of which (80 feet in span) he showed the resources of his constructive genius. He made additions to Hampton Court Palace, and was the architect of Chelsen Hospital and of portions of Greenwich Hospital to him we owe the Library of Trinity College and the second-court of St. John's College, Cambridge.

Although not a Gothie architect, he was called upon to complete the western towers of Westminste. Abbey, in which at least he knew how to group their design so that, without examination of the detail, they group harmoniously with the rest of the structure; and in Tom Tower, Oxford, built over the archway of Cardinal Wolsey's work, he designed a crowning feature which might well be taken for a part of the original design., Wren was succeeded in his practice by Hawksmoor, his favourite pupil.



lg. 52.—The Houses of Parlanessy (From a Philogorph by Frith & Co., Reigns

and by Sir John Vanbrugh. To the former we owe the church of Si. Georges, Bloomsbury, a building with a fine portice of Corinthian columns, and a tower surrounted by a pyramidal-stepped spine, in initiation of Pilny's description of the manuscham of Hallecarnessus. He also build Si. Jiary's Woodship, Jonubard Street, and the church of Si. George's-inthe-East.

Sir John Vanbrugh's chief works were palaces, of which Castle Howard and Blenhein were the principal examples; in the latter the plan is very grandiose in its design, the exterior is heavy and badly composed. He employed the same gigantic order as Michael Angelu, but without the same knowledge of proportion and detail. The same feature is introduced in the central block of Castle Howard rising through two storeys. In comparison with this palace, the front of Wunstead House, by Colin Campbell, compares favourably, ' Here, there is the same gigantle portico in the centre, but the rost of the building is freed from pilaster decoration, the windows above giving the chief features of the upper storey over a ground storey with rusticated masonry. Colin Campbell, in conjunction with the Earl of Barlington, was the architect of Emlington House, portion of which now forms the entrance to the lloyal Academy.

The next methicet of note was James Gibbs, who in the commencement of the eighteenth rentury bullt the church of St. Jamitos-in-the-Fisids and 10 Seford the creatal building known as the Indeliffe Liberty, one of the mest original and best designed buildings of the Intilain style in England. His church of St. Jamy-k-Stand 1- still fortunately one of the chief organization of the Merropoles.

Sir William Chambiers, the architect of Somerset House in the Strand, both in the Strand and river fronts produced a work which compares most favourably with the finest works of the Inflain musters; and Dance, in Newgate Prison, conocived a design which is unmistakable in the character of its destination, and therefore of high merit.

This brings, our history virtually down to the end of last-centus, The inducental courty commenced with a revival of Roman work, chiefly due to the publications of the Bruthers Adam and to Dawkin's and Woods. "Palmyra and Banilbee," and the interest which those ungunificent works awakened. I was followed by a Greek revisal, caused by the attraction felt by the chancted classes in the work of the Dhettanti Society and the nequisition through Lord Eign of the seatpures of the Parthenen. To this succeeded about 1820 a Guittie revival, of which Webly Pagin was the older final-piece and Sr. Gilber. Scott, William Burges, and G. A. Street the chief exponents. Though principally confined to exclusions.

tical work, listninence extended to monumental and douestics arothecture, as in the New Houses of Parliament (1840), and the New Law Courts in the Strand (1876) which may be Jooked upon as its final outcome. During the last feer years a second revival of the early-plasses of the Emrissance of the early-plasses of the Inemissance of the early-plasses of the Inemissance style lass creeping in, and though nominally based on the simple type of "Quoen Anne" brick architecture, it has sought for its models:—Jst, the Irick buildings of the Low Countries and North Gurmany, and, John, the pure Countries and North Gurmany, and, John, the pure Countries and North Gurmany, and, John, the pure Deposition of the Countries and North Gurmany and, John, the John Countries and North Gurmany and Parlow (1818) and the Countries and North (1818) and the North (1818) and the Countries and North (1818) and the Countries and North (1818) and the North (1818) a

TERMS USED IN COMMERCE,-II.

CHCULAR NOTE.—A note or bill issued by bankers for the convenience of travellers, affording a choice of traines places for obtaining its payment. CHCULATING MEDIUM.—The authorised or recognised means of making payments in a country.

Cuculation of a Bank.—The amount of licensed issue of its own notes payable to bearer on demand.

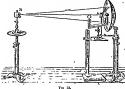
CLEARING A VESSUE,—Entering a ship's name and particulars of her cargo at the Castom House preparatory to her leaving port.

CLEARING IN JANKING.—A plan adopted by the general body of London bankers for a duly exclaiment of elegance and bills at a house in Londiary Markers for a duly exclaiment of elegance and bills at a house in Londiary Mirch Cerving Hume. A clear from each establishment altends twice a day with the chepens and bills he may have on the others, and distributes them la drawers allotted to the several hanks. They then manko out balance scheek, cutering on the Dr. side the sum each lank over them, and on the Cr. side the sum they owe cache bank. Those who have money to receive on balance take it shifted maintainty from these who have to pay, a ff is evident the sams to be paid must, in the aggregate, poug the sum as to be practice.

COCKET.—A warrant from the Castom House, certifying that the goo's therein named have been entered, and are either duty free, or that the duty on them has been raid.

COLLATRIAL, SECURITY.—A secondary or indirect security for the fulfilment of a contract, or for money leut.

*COMMISSION. — An allowance or percentage made to agents for buying or selling goods, or for negotiating business of any kind. differential thermometer be placed in the focus of the mirror, a screen, A, being placed so as to keep off the direct rays from M. The indicating bubble



will at once show the lucieuse of temperature; If the bulb be snoved at all out of the focus, the bubble will return to its place, clearly showing that the mys have been reflected and brought to a focus. By menas of a small mirror we can easily prove that in the case of reflected heat the mode of mchlonce is always ornal to the angle of reflection. An ordinary short of tra held in front of u fire will illustrate this reflection of heat, and from it we shall understand the are of reflectors in rousting. As the amount of heat reflected depends upon the brightness of the reflectors, the nucessity of keeping them clean and bright will be appment

ltays of heat may be refracted as well as refle Whan a beam from an electric lump is caused to fall upon a prism, the luminous rays are bent out of their course, and resolved late the prismatic enlours; the heat ture are likewise diverted; and if we place behind the spectrum a metal screen with a narrow slit in it, so us only to ollow the rays from one part of the spectrum to pass at a time, we may, by a thermo-electric pile, test the heat of different parts. In doing so we find that at the violet and of the spectrum there is but little heat; even in the yellow, though that is the most luminous port, there is not much. At the red portion the heat is greater, but its intensity is greatest when the pile is moved altogether beyond the visible spectrum, so that the most fateuse portion of the heat is altogether non-luminous. The thermal spectrum, in fact, overlaps the visible one-

DIFFERENCES OF RADIATIVE POWER When we commence to try experiments on the midiation of heat, we soon find that different surfaces

possess different powers of threwing off rays of heat. This is easily shown by means of a "Leslie" cube (Fig. 32), which consists simply of a tin or pewter cube with an opening on one sido, by which it can be filled with boiling water. One side may be covered with a layer of gold-leaf, another with glass, a third with lampblack, while the fourth is left blank Each side is now turned in succession towards, the therme-electric pile, and the exact deflection of the accile is noted. Other substraces may then be laid on the sides of the cube, and in this way a table showing the radiating power of different bodies may be drawn up.

When the gilded face is towards the pile, little effect will be-produced; if the pewter be a little tarnished, a greater deficetion will be produced when that side

is turned to the pile. When the glass side is presented, the lutensity will be much more, while with the laun-black it will be most of all. As lamp black is the best rulinter, its power is represented by 100, and thea the power of gold and other brilliant metals will be be-

tween 12 and 15, Another way in which we amy show these different powers of midiation is to observe the time which water takes to cool when placed in different seasels, Take, for example, two similar cubes, mul let one be covered with lamp-black while thu other is left

bright. Fill both with boiling water, Fig. 32. and after some thue test the temperature of each. That coated with lamp-black will be found several degrees cooler than the other. It has radiated beat more rapidly, and hence has lust

a larger amount. If we substitute a lump of ice ur a cube of icecohl water for the vessel M (Fig. 31), and place the thermometer as before, it will fall, and thus indicate nn apparent radiation of cold. This is only apparent. however; both the ice and the thermom a certain amount of heat, which they radiate. The thermometer, however, being at a higher tempe ture, throws off more intense rays, and hence, as it arts with more heat than it receives, its temperatu

falls. The chill felt when standing near a cold surface may be shallarly explained.

COMMERSIONATER.—A member of n body of disabled soldiers, carolled to furnish the public with trustworthy messengers.

COMMERSIONERS IN BANKAUPTON. — Persons

COMMISSIONEDS IN BANKINDPTOY. — Persons appointed to indjudicate in the Court of Bankingtoy.

COMPANY.—A number of persons associated

together in one common interest; and for the carrying out of any trade or course of operations. Also applied to the members of a firm not named in its signature, as "Smith Bros. & Co."

COMPOSITION.—The settlement of the debts of a bankrupt by payment in part. Compounding, on Compromising with Camp-

COMPOUNDING, OR COMPROMISING WITH CRID-ITORS.—Debtors paying a portion of the claims of their oreditors by way of composition, on the latter, by agreement, giving an acquittance for the

whole.
COMPOUND INTEREST.—Interest paid not only
upon the money lont, but on the interest which
from time to time becomes due to the leader and
is not paid.

CONDESSION.—A grant of certain privileges made by the Government of a country to any person or firm understuding to carry out undertakings affecting the public interest. The parties obtaining such concessions are termed Concessionaire. CONSIGNMENT.—A parcel or quantity of incr-

chindles sent (generally nbroad) for sale, or to be delivered, as the sender may direct. The person sending is termed the Consigner, and the person to whom they are sent the Chesiques. CONSUL.—A public official stationed in a foreign

country to watch over the interests of the one he represents, and of its subjects located thore. COSSUL'S CENTRICATE.—A certificate granted by a censul, of the quantity and valoe of any merchandics sent to the country he represents. It

by a constant of the quantity and vance of any merchandise sent to the country he represents. It is given on faith of the cath of the Consigner, and notes as a vonchor to the Centom House of the port to which the goods are consigned.

CONTINGENCIES.—Liabilities likely to arise, but

which cannot be exactly determined.

CONTRIGATION, OR CONTRIGO.—The additional price or rate of interest paid for an extension of time by speculators on the Stock Exchange, who inve purchased stock or shares on oredit.

. CONTRA.—A Latin word used in accounts, signifying against or on the other side.

CONTRABAND.—A term applied to goodsimported

or experted against the laws of the land, or without complying with its conditions. Contract.—A verbal or written agreement be-

tween two or more persons, which binds them to certain relative specified acts. CONTRACTOR.—A capitalist or person who binds bimself to others to effect certain works, or to supply certain quantities of goods or materials upon speci-

fied terms and conditions.

COUPONS.—Small printed warrants for interest, attached to bonds for the purpose of being cut off

and presented as each payment becomes due.
COURSE OF EXCHANGE.—The current rates for exchanging the money of one country for that of others, as applicable to bills.

CREDIT.—A term expressive of trust or confidence, and used when property is supplied upon the understanding of payment at a future period. It is also applied to the commercial stunding and position of persons who, as the case may be, are said to be in sould are deredit.

CREDITOR.—One to whom money is due.
CURRENCY.—The mosey of, or that which passes

CUSTOMS DUTIES.—Duties levied (as a means of zovenue to a country) on the importation or ex-

portuition of goods.

DATE OF GLACE.—The number of days allowed beyond the expressed terms of a bill before payment can be legally domanded. They vary much in different parts of the world, but in the United States three days are kingtom and the United States three days are demund or at eight. The following me the number of days allowed at the respective places named :—

Ameterda	Ma				Lisbon and (Local . 1
Antwerp					Opento i Foreign
					Madrid . 1
Balda					
					Milan
Berlin					Nuples
Rilbon					New York
Honleany				in	Operte
Dremen					
Cadle				7.	France 10
				13	Rio de Jeuerra
Dantele					
Pronkfort					Rotterdam
Genera					St, Peters (afterifate . 10
Orma.				30	bearg (at sight . !
Orbraltar				14	Trieste
Hambuig				12	Venter
_					Vienna
Dete		 	-		v. Accorves — Accounts

not dealing with persons but with things, such in Bad Belts Account, Profit and Loss Account, etc Dennsyme.—A Gustom House certificate entitling the exporter of imported goods to n drawback of the duty originally paid on importation.
DERINTORES.—Deeds by which a company mort-

gages its property for borrowed money; the condition being that the holder has a right to setze the property If he be not repaid at the stipulated time, or in the event of default in any of the conditions of the deed.

DEBIT.—An entry on the Dr. side of an account.

DEBITOR.—One who owes money.

DECLARATION OF TRUST —A written efficiention

of confidence in the person in whose hands is pla the management and control of an estate or business. DEL CREDERE COMMISSION,-An extra commission paid to an agent for guaranteeing the payment of an account which he has been the means

of opening. DEMURRAGE,-Compensation paid to the owners by the charterers or freighters of ships, for their detention beyond a stipulated time.

DEPENDENCIES .- Assets likely to occure, but

DETENDENCIES.—Assets likely to occrue, but which cannot be exnetly determined.

DETOSIT.—A sum of money placed in interest with a banker for a specified time. The person delug so is termed a Depositor, and the account seording the transaction a Deposit Account.

Denerater.—A ship abandoned at sea.

DETINUE.-An action for the recovery of withhold property

DEVIATION.—In the marice commerce, departu from any of the terms of the policy of insuranco. If it be a departure from the course laid down for the ship, without actual necessity such as stress of

weather, it thereby vitiates the insurance. Dinecton.-One of a bedy of proprietors deputed by the rest with power to control and direct its

oporations DISCOUNT.—A percentage allowance on payments of money before their dun dates. As applied to shares or stock, it indicates the depreciation below

the nominal value of such shares or stocks. DISHONOUR OF A BILL -The refusal to n n bill by the person on whom it is drawn, or the foiling of an acceptor to pay it when it becomes due. DISSOLUTION OF PARTNERSHIP.—The not of

breaking up an association formed for the parpose of trade, or the not of retiring from such association of one or more of the parties concerned.

DISTRINGAS.—A writ commanding a person to be confined for debt, or for his appearance on an appointed day. DIVIDEND.—The periodical division of the profits

of a communy. The distribution among creditors of the property of a bankrupt is termed a dicidend, as is also the numaal payment of interest on the National Debt. DOUK -Au artificial basin for the recoption of

ships, and to assist them in loading and unleading. DOCKET .- A ticket or direction tied to goods; also a summary of any document or legal instrument. DOOK WARRANTS certify as to goods in charge of the Dock Companies, and specify the ship by which they were imported, the importer, date of entry, to whom deliverable, the distinguishing

marks, packages, and the gross and not weight, with the date at which warehouse rent comme DOCK WEIGHT NOTES contain specifications

similar to those in the warrants. They are deliverable to purchasers of produce on payment of any deposit, and entitle them to the warrants on the completion of their payments.

Dovestut.—A gratuity given for the exercise of my influence on behalf of the denor. DRAFT,-A term applied both to bills ond cheques; also no allowance made in weighing certain articles

of merchandise. DRAWBACK.—The amount of duty refunded upon the exportation of excisable articles, or upon the re-exportation of foreign goods on which duty has been paid.

DRAWER.-The person drawing a bill upon nuother, who is called the Prance.

DUNNAGE.—Asyntticles used in stowing a ship's eargo, for the purpose of protecting it from domage.

Disnage is also required for triuming a ship lodes with hemy goods (such as fron, etc.), by slightly

raising the cargo.

DUTCH AUCTION,-The plan of offering articles at nominal prices somewhat above their value, and gradually lowering them nntil accepted, the person ,

who first assents becoming the purchaser. DUTIES.-Taxes or imposts of any kind upon merchandise or manufacture, payable either through Customs or Excise.

EFFECTS .- Personnt or movable goods. ELEGIT.-A writ commanding the goods of a dobter to be taken in execution, but not to be sold The creditor remains in possession until satisfied.

during which time he is tenant by elegit. EMBARGO.-An order arresting the sailing of a

ship or the removal of property.

ENDEZZINETY.—The Irmulation appropriation
by clerks or others of cash or goods pinced by the
employer in their care, or received by them on his

EMPORIUM.—A principal place or mart for the reliase and sale of certain merchandise.

ENDOWMENT .- A fixed snm, payable at the end of a certain number of years, In the event of a person surviving the given time.

ENGROSS.-To buy up in large quantities, so as to mise the price of the goods bought, and to sell ot a profit. Also, in law, to copy in a large fair hand. Ho who does so is called an Engrosser, and the act

is termed Engrossing, or an Engrossment. EXTREPOT.-An intermediate pert for trade, or warehouse for the temporary reception of merchan-

dies in termelts ERRATUM.-An error or mistake. Plural, Errata

ET C.ETERA (&c. or etc.)—And so on. Eviction.—The loss caused to the bayer of anything in consequence of its being proved to belong to a third party.

a volume or account book, and specifying the page on which each item is to be found.

INDORSE.—To write on the back of a document. The person writing is the *Indorser*; the person to whom he transfers any right is the *Indorsec*; and what is written the *Indorsetion or Indorsement*.

what is written the Indorsation or Indorsament.

IN FORMA PAUPLEIS (in the form (or condition) of a poor person).—A mode of bringing a suit to avoid the payment of fees.

INSOLVENT .- A person whose resources are insufficient to meet the whole of his liabities.

INSPECTORS III, DEED OF.—A deed by which a person unable to meet his engagements places his business in the hands of his creditors, who carry it on until satisfied in whole or in part, under the hands of trustees termed. Insuectors.

INSURANCE is founded upon the principle of general combinations for the purpose of dividing and appropriating amongst the whole body any individual loss that may arise, seah member contributing a small percentage of his property to secure the rest—the contribution being in proportion to the tisk to be incurred.

INTEREST.—The produce of employed capital, or the consideration due for the loan of capital at the expiration of the term for which it has been used. When money is lent with the stipulation that interest shall be regularly paid, yearly or half-yearly, and not be added to the principal as it necroses, it is termed simple interest; and when the stipulation is made that interests as it becomes due shall be added to and become part of the principal, it is termed compound interest, as the successive additions bear interest upon interest. Interest is also a term applied to any inherent or other right in, or benefit to be derived from, property, business, or security.

INTEREST (SHORT).—In marine insurance, when the value of the goods shipped is short of the sum insured. A declaration of this sum being at once made upon the policy, the insured are entitled to a proportionate return of premium. (See Open Policy.)

In Transitu.—Two Latin words signifying in course of transmission, or on the way.

INVESTMENT.—In commerce, laying ont money. Capital sunk or employed in any permanent way is said to be invested.

INVOICE.—A mercantile term for the account

specifying the contents of each package of goodshipped, their cost, and the charges upon them; now generally applied to all specifications of goods sold. I. O. U. (I once you).—A memorandum acknowledging a debt.

JERQUER.—A Customs officer, whose duty it is to search vessels on their arrival, for the purpose of

ascertaining whether any unentered goods liable to duty are secreted, with a view to their claudestine introduction into the country.

introduction into the country.

JETSAM.—See Flotsam.

JETTERON.—The act of throwing overheard part of a ship's carge, or enting away masts, sails, etc., for the preservation of the rest of the carge and ship. The owners of a ship or goods so jettisened have recourse, by general average, upon the owners of the portion saved, who, in their turn, if they are insured, recover from the underwriters.

FOINT ADVENTURE.—A mercantile speculation in which more than one interest is concerned.

LAC.—A term used in Judia, denoting a sum of 100,000. One hundred lacs equal one erere, or 10,000,000.

[ANNING ACCOUNT.—An account taken by the various dook companies and wharfingers of all goods landed, with their weights and other particulars as to the condition of the packages or merchandite. ALANDER WATERS.—A DUSTONS officer, whose LANDERS WATERS.—A CHARGE OF THE ALANDERS WATERS AND ALANDERS WATERS AND ALANDERS WATERS WATERS AND ALANDERS WATERS WA

LAY DAYS.—The number of days allowed for unloading or loading ships, as stipulated between their owners and the charterers or freighters.

LAZARETTO.—An establishment in which quarantine is performed, and in which the goods landed from ships in quarantine are fumigated previous to their introduction to the markets.

LEASE or TACK.—A conveyance for a term of years (which term is always less than that which the lessor holds for) of houses, land, or any other description of property. The person granting the lease is termed a Lessor, and the person to whom it is granted a Leaseholder or Lessee.

LETTER OF CREDIT.—A letter from a banker or mercantile house, requesting their agent to pay money to a third party—the bearer of the letter.

LETTER OF LIGENCE.—An agreement signed by the creditors of an insolvent or embarrassed trader, permitting him to carry on business for a certain time without satisfying their claims.

LETTERS OF MARQUE.—Letters granted by a Government to its subjects, authorising them to fit out ships (called privateers) to prey upon the commerce of a rival country.

LEVARI FACIAS.—A writ of execution, commanding a sum of money to be levied upon the effects of a defendant.

LIABILITIES.—The debts and pecuniary responsibilities of any person or company.

Lies.—A conditional right of claim upon property, such as is voluntarily granted by its owners EVIDENCE.—The proof of anything.

EVALUATION.—A term desisting the transactions by which persons in out country to the purchase of the property of the propert

EXCHEQUER BILLS are promisory notes issued by authority of Parliamont, and represent the greater portion of the floating or unfunded debt of this country.

Excise.—A tax or duty upon certain articles produced or manufactured in the country. Officery of Excisery Gaugers are the persons appointed to collect these daties. Exacuron.—One who is appointed by a testator

EXECUTOR.—One who is appointed by a testator to see that his will is properly carried into effect after his decease.

Ex Oppinio.—A term denoting the power a

person possesses by virtue of his office.

EX PARTE.—Two Latin words signifying is part; as an not, deed, or statement hy one party only, without the participation of the other.

EXPORTS.—Goods sent out of a country.

EXPORTS.—Goods sent out of a county.

FACSULLE—An exact copy of an original, with
all its peculiarities.

FACTOR—An old term for agent, still retained in
certain trades, as corn-factor, fail-factor, etc.

certain trades, as corn-factor, fish-factor, etc.

FACTORY.—An establishment in which some
branch of industry is carried on; also a place used
by traders and agents (factors) for the negotiation

FALURE—The entpension of payments by traders.

FER.—A compensation or raward for services rendered.

FLAT IN BANKBURTOK.—The issue of judicial

authority by the Coart for proceeding in any case,

First Facias (or Fi. Fis.).—A judicial writ, after judgment is, obtained for debt or damnge, commanding the sum to be levied on the effects of the

defendant.
Finance.—The rovenne of a king or state.

FINACUER.—One who manages finance.
FINA.—A term upplied to any trading stablishment carried on by more than one person, or styled with more than one person some.
FINCAL—Relating to the revenue or peculiary

affairs of a state.

FLOTEAR.—In marine tosurance, goods floating on the surface of the waves—the term Jotans being used when they are sunk under the surface of the water. Both appellations are distinctive from

wrecked goods, which, to be considered such, must

FOLIO.—A leaf; two pages numbered alike and facing each other, one being allotted to the Dr. and the other to the Cr. side of an account. Firm Pour.—A port where no import or export duties are levied.

FREE TRADE.—The freedom of buying and selling goods without such restrictions as duties, etc.

FREEGHT.—The sum raid for the transportation

of merchandise forming the cargo of a ship, or for the hire of the whole or part of a ship. FUNDS.—The interminable annuities or funded

portions of the National Debt, som times called Stacks. GARBLE.—The dross or refose picked from spices, drugs, and other produce, in the process of garbling

or sorting.

GREINIMINET.—The notice in cases of nitachment given to third parties, called **garwishes**, not to part with money or goods in their possession, pending the sottlement of olaims against the owners.

(See Attackment.)
GAUGER.—A Custom House officer appointed to
examine the contents of hogsheads, barrels, etc.
GAZETTE.—The London Gazette. A publication
issued under authority of the Government, containing all parliamentary, official, legal, and commercial

GOODWILL.—The advantage accruing to any concern from an established trade or connection.

GROSS.—The mass or bulk of anything.

GUARATER.—The undertaking to perform or pay for another in ones of his being unable to fulfil his engagements, or committing a fraud with regard to the matter guarantees for. The person doing so is present of the description.

HAT MONEY.—See Prinage.

HOME CONSUMPTION.—An expression used for the ordinary trade demand for various commodities consumed in the country.

HONOURING.—Duly meeting claims or obligations.

HONOURING.—Duly meeting claims or obligations.
HOUSE,—A word almost synonymous in its meaning with first, het occasionally applied as well to n concern carried on under the name of one person only.

HYPOTHECATION.—Giving a lien upon, or pledging documents conveying a right to, property in the hands of third parties. (See Collateral Sectrity.) IMPORTY.—Goods brought into the country.

INDENTURE.—A deed or agreement in writing, with special covenants.

INDEMNITY.—Making good any ioss or injury

nstained.

INDEX.—An alphabetical list of the contents of

value of the specie of different countries according to their fixed standards of weight and purity. PARTNERSHIP .- The combination of two or more

individuals for the purposes of business in common. each deriving a share of the profits, or bearing a corresponding share of the losses arising from it.

PASS BOOK .-- A book passing between bankers and their oustomers, which records all payments and receints.

PASSPORT .- A document granted by a consul, giving a description of the owner, and entitling him to pass through or to reside for a time in the country for which it is given. In maritime law, a document carried in time of war by a vessel to prove her nationality.

PATENT, LETTERS-PATENT.-A privilege granted under the Crown seal, conveying to the persons specified the sole right to make use of some new invention or discovery therein stated.

PENALTY .- A sum to be forfeited for the noncompletion of a contract or for a part of it. PER CENT,-" By the Hundred," Thus 5 per

cent. would be five out of every hundred. PERMIT .- A licence from the Excise authorities

permitting the removal of goods upon which duty has been paid. PILOT.-A person duly qualified and authorised

to conduct ships through rivers, into or out of port, or through certain channels or roads, PLANT .- A trade term comprchending fixed

machinery, implements, or other requisites for carrying on a business.

POLICY OF INSURANCE,-A document by which insurance companies and underwriters secure to the parties contracting with them for life, fire, or marine insurance, an indemnity against loss from the risk incurred. It is a document of considerable importance, stating the names of the insurers and of the insured, the amount and exact nature of the indemnity, and of the risk incurred.

Post, To (Book-keeping) .- To transfer an entry from one book to another,

: POSTDATE.-To date a letter or document of any description later than the day on which it is

POST OBIT BOND .- A bond, the main condition of which is that it only becomes payable after the death of some person whose name is therein specified.

PRÉCIS-WRITING -- Writing the contents of a document in as short and condensed a style as possible.

PREMIUM.—An additional sum beyond a standard or fixed price.

PREMIUM (INSURANCE).—The percentage or sum paid by the insured for the indemnification granted ov the insurer.

PRESENTMENT OF A BILL.-The act of demanding, or presenting for, acceptance or payment.

PRICE CURRENT .- A list or enumeration of various articles of commerce, with the market price of each.

PRIMAGE, OR HAT MONEY .- A customary percentage raid by shippers, in addition to the freightof goods, and considered to be for the master of the vessel, for his care and trouble in taking charge of such goods while on board.

APPLIED MECHANICS.—XVIII. [Continued from p. 217.]

PRACTICAL APPLICATIONS OF CENTRIFUGAL PERHAPS the commonest application of the pro-

FORCE.

perties of a revolving body, to which we have just referred, is to be met with in the use of centrifugal governors on certain machines, especially on steam and other engines. The contrifugal governor in its simplest form was first employed on steam-engines liv James Watt. It consists of a pair of heavy balls suspended by links, as shown in Fig. 107, the whole being caused to rotate by the engine to be

"governed." If the speed increases. the balls fly out. raising the sleeve s. which is connected to the throttlevalvo, through the

Fig. 107.

bell-crank B; thus the steam supply is diminished or cut off altogether. The defect of such a governor is that the engine must first change

its speed before the governor acts : but the change may be kept within very small limits. It will be an interesting exercise for the student to consider the

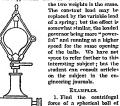
equilibrium (neglecting friction) of the forces acting. Thus the pull of the link I is halanced by two forces, the centrifugal force F and the weight ir of one ball, as shown in Fig. 108. The forces are parallel to the sides of the triangle, PQ R (Fig. 107); hence-

$F: w = r: h \text{ or } F = \frac{\pi r}{h}$.

More usually the governor is loaded, as in Porter's governor, shown in Fig. 40, in which case it is not difficult to prove that the force available to do the work of moving heavy parts and overcoming friction is increased by the device of leading the governor,

in the ratio of
$$\frac{N+w}{x}$$
, and that the speed of the

governor is also increased as
$$\sqrt{(\frac{W}{2} + n)}$$
 to \sqrt{n} ; on the supposition that the vertical movement of



1. Find the centrifugal force of a spherical ball of cast-iron 3 inches in diameter, when its centre is

Fig. 100. meter, when its centre is rotating in a circle of 2 feet radius at 150 revolutions per minute. A cubic fach of cast-iron weighs 26 lb.

Answer, 56.31b.

2. Find the total centrifugal force of the two balls of a Watt centrifugal governor, the balls being of cast-iron 3 inches in diameter, when rotating with their centres 8% inches from the raits, at a speed of 50 revolutions per minate. If a constant weight of 20th, in placed on the sleeve of the governor, find the state of the governor, find the world of the governor, find the world of the governor in the balls rotating at the same radius, friction being neglected.

Answers.

Unloaded governor, centrifugal force = 14:38 lb. Loaded , , , = 53:49 lb. Speed of loaded governor = 173:7 revolutions per minute.

3. A locomotive passes round a curve in a railway for 500 feet rails, at a speed of 30 miles an hour of 500 feet rails, at a speed of 30 miles an hour of 500 feet rails, at a speed of 500 miles and 500 miles rails, supposing them free to more outwards. If the centres of the rails are fee feet apart, but much would, the outer rail have to be elevated so "Frotices" Edgs in its sattled on the Stean Engles.

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e that the resultant force due to gravity and centri-

fugal force would not perpendicularly to the plane of the rails? In such a question as this, is it necessary to know the weight of the train?

Answers. (1) Centrifugal force = 4309 6 lb.
(2) Outer rail must be elevated = 6 ft.

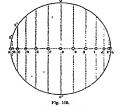
(3) No. 1
4. Show that Rankine's rule, by which the eleva-

tion of outer rail should $\equiv \frac{\text{gauge} \times v^2}{15v}$, where v is the speed in miles per hour, is approximately correct.

DARMONIC MOTION.

When a body has such a motion that after a certain interval of time it is ugain passing any fixed point and meeting in the same direction as before, its motion is persoid, and the time which it has taken is cathed the periodic time of the motion. A very simple examples of periodic motion is that of a body moving uniformly on a circular path, the controller time. There are many examples of periodic motion, and some belong to that peculiar class of periodic time. There are many than product a controller time.

DEFINITION.—Simple harmonic motion is the projection of uniform circular motion on a diameter of the circle. The meaning of this definition will be understood from Fig. 111. Let a body move on tho



circumference of the circle with a mifpras selectify, taking say, \$\phi_0\$ for a second to go from a to \$\psi_1\$. If ton \$\psi\$ to \$\phi_0\$ cto, these distances being equal. Now, if a second body moved in such a way as to always just occupy, the position of a projection of the first on the dimerter \$\phi_0\$, the projection of the first on the dimerter \$\phi_0\$, the projection of the control to be uniform, but would be quicker towards the below that the project of the project of the project of the middle of its path and slower towards the ends; in fact, in the case we have supposed, it would take J. of a second to go from A to B, and the same time to go from F to 0, which is a much greater distance. A hency ball, suspended by a very long thin wire, bas'a motion very nearly of this kind when vibrating like a pendulum, and many motions with which the engineer is concerned approximate closely to simple harmonic motions.

There are certain peculiarities about this motion

which might almost be taken as definitions of it. For instance, a body moving with a simple harmonic motion always has an acceleration proportional to its distance from its mean position, the positive acceleration being always towards that point. In other words, the body moves with an increasing velocity when moving towards the point referred to. and with a diminishing velocity when moving away from that point, the acceleration being proportional to distance from it. Since acceleration = force and the mass is constant, the force acting on the body arging it to relarn to its mean position must

be proportional to its distance from that position. Elthor of these characteristics of simple harmonic motion may be taken as a definition of it, but we prefer that which has already been given. The periodic time T of a simple harmonic motion is given by the following rule :--

No elementary proof of this rule is altogether

satisfactory, but the following is us good as any :-The noceleration of the point on the diameter is equal to the resolved part-along that diameterof the centripetal acceleration of the point on the circumference-i.c., the resolved part of re; which

$$T \cap T$$
Displacement = x ,

acceleration =
$$\frac{1^2r}{r^2}$$
 . . . $\frac{\text{displacement}}{\text{acceleration}} = r - \frac{t^2r}{r^2} = \frac{r^2}{t^2}$.

which is evidently constant. Now the periodic time T is the time taken to describe one circumference, hence (since distance = velocity x time),

$$2\pi r = v T, \text{ or } \frac{\tau}{r} = \frac{T}{2\pi}$$

$$\therefore \frac{r^2}{r^2} = \frac{T^2}{4\pi^2}$$
hence displacement = $\frac{T^2}{4\pi^2}$
or $T = 2\pi \sqrt{\frac{H^2}{2\pi^2}}$
or $T = 2\pi \sqrt{\frac{H^2}{2\pi^2}}$

To the student who possesses a slight knowledge of the Differential Calculus, the following brief demonstration may be useful :-

Let the body moving on the circle have an angular velocity of A ra-



dians per second, and let time bemeasured from the instant of passing of (Fig. 111), The displacement a of the projection agrees with the angular displacement At of a radius r. Referring to the motion of the projection. its velocity is-

$$\frac{dr}{dt} = Ar \cos At, \text{since } x = r \sin At;$$

. . . necessoration =
$$\frac{d^2x}{dt^2}$$
 = $-A^2r \sin At$

which shows that acceleration oca. If T is the periodic time-

and the rule just obtained becomes-

$$\text{secceleration} = -\left(\frac{2\pi}{T}\right)^2 r$$

the - sign showing that the velocity decreases as the body moves away from its mean position.

the negative sign being neglected. This is the rule already given for the periodic

The application of these rules to different examples of simple harmonic motion will not present much difficulty. A few illustrations of the method of applying them will

now be given. EXAMPLE.-Find the time of vibration of a simple pendulum in terms of its length, and the

value of g. We can only represent a sim-

ple pendulum approximately. and this we do by suspending a small ball of heavy material by a long light silk thread which is supposed to remain of constant length. When the ball vibrates in small ares, apply the rules already given. By referring to Fig. 113, it will be seen that the force acting along the tangent DA to the arc at A isLOGIC.

$$W \times \text{cos} O\Delta W$$

= $W \times \frac{AP}{AW} = W \times \frac{AK}{AS}$.

since the triangles KSA and PWA are similar. Now, since the arc is very small. A K may be taken as count to the arc o A, which is the displacement x—

$$zecoleration = \frac{torce}{mass} = \frac{wx}{\frac{wx}{\theta}} = \frac{mx}{t},$$

is 32·29.

$$= \frac{2\tau}{4} \sqrt{\frac{displacement acceleration}{x + \frac{\theta x}{2}}}$$

$$= 2\tau \sqrt{\frac{L}{2}}$$

l being measured in feet

NOTE .- The time of vibration of an ordinary seconds pendulum is two seconds.

Another example is the vibration of a mass suspended from a cylindric spiral spring. EXAMPLE.-Suppose a spiral spring clongates a

inches (x being usually a fraction) for 1 lb. increment of load neglecting the weight of the spring itself, find its time of vibration with a load wilb. Consider the spring when x inches from its mean position. The force tending to bring it back is 1 lb., the displace-

ment a of a foot, and the acceleration = force 1 lb.

+ mass of bail=1 + $\frac{w}{g}$ = $\frac{g}{w}$, and hence the time of vibration is-

$$T = 2\pi \sqrt{\frac{x}{12} - \frac{0}{W}} = 2\pi \sqrt{\frac{Wx}{12g}}$$

In a similar way the time of vertical vibration of the cage in a deep shaft of a mine may be worked out, the suspending rope acting in a way resembling the spiral spring in the last example.

NUMERICAL EXAMPLES. 1. Find the length of a simple pendulum which beats seconds at a place where the value of g

Answer, 3-17 feet, 2. A ball weighing 20 lb. is suspended from a cylindrio spiral spring. If the spring lengthen 12 inch for an additional load of 1 lb., find the time of vibration, neglecting the weight of the spring. Answer, T = 495 second.

3. A cage weighing one ton is supported by one mile of vertical steel wire rope, one square inch in cross-section. Taking Young's Modulus for the rope as 28000000, assuming that the rope and cage vibrate longitudinally with a simple harmonic motion, and that half the mass of the rope may be taken as existing only at its lower end, the other half neglected : find the time of vibration.

Answer, 1.6 seconds,

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HYPOTHETICAL SYLLOGISMS - SORITLS - INDUCTION. HITHERTO we have treated only of the pure Categorical Syllogism, which consists of three categorical propositions, called by some logicians propositions de incree, from their asserting that the predicate is (or is not) contained in the subject.

We have seen, however, that there are also Hypothetical Propositions, composed of several (i.c., two or more) categoricals united to one another by a conjunction, called a copula, and named Conditional, Disjunctive, Causal, etc., according to the names given by grammarians to the respective conjunctions which unite them.

Now a hypothetical syllogism is one in which one, two, or all three of the propositions are hypothetleals : e.g., (1) " If this man is wise, he is happy; he is wise; therefore, he is happy." (2) "He who is wise, is happy; if he is a philosopher, he is wise; therefore, if he is a philosopher, he is happy." (3) "If he is wise, he is happy; if he is a philosopher, he is wise: therefore, if he is a philosopher, he is happy." Of these, such syllogisms as in the first example are far more common than those resembling the other two.

Hypothetical syllogisms are divided into Conditionals and Disinnetires, the other kinds of hypothetical propositions not giving rise to particular classes of syllogisms bearing their names.

A conditional proposition is said to have in it an illative force-i.e., one of the two categorical propositions of which it is composed results or follows from the other. The name of antecedent is given to that from which the other results; and that which results from it is called the consequent; the connection subsisting between the two being termed the consequence. It should be remarked that it is entirely upon this consequence that the truth or falsehood of the conditional depends, and not at all upon the truth or falsehood of either the antecedent or consequent, or both of them. Either or both of these may be false or absurd, and yet the conditional be true, i.e., the consequent may follow from the antocedent notwithstanding. For example, in this proposition, "If the atheists are right, there is no God," both the antecedent and consequent are false, and yet the conditional proposition composed of the two together is true, i.e., the truth of the consequent follows from the truth of the antecedent.

The meaning of every conditional proposition, then, is-that the antecedent being granted, the consequent is granted also. This may obviously be considered from a twofold point of view :- 1. If the antecedent is granted, the consequent must be granted. 2. If the antecedent were granted, the consequent would have to be granted. Hence are derived these two rules :- Firstly, the antecedent being granted, the consequent may be inferred (which does not require explanation). Secondly, the consequent being denied, the antecedent may be denied; because, if the antecedent could not be denied, i.e., if it were true, the consequent (which is granted to be false) would be true also. These rules may be made clearer by an example. "If a state is well governed, the rights of the weaker are secured." Here, if we grant the truth of the antecedent, the truth of the consequent may, by the first rule, be inferred, and we may reason thus: "But this state is well governed, therefore the rights of the weaker are secured." These three propositions taken together give us a Conditional Syllogism. Every conditional syllogism of this kind, in which, by the application of the first rule, we, as it were, build up an argument, is called constructive, and is reducible to the form-" If A is B, C is D: but A is B, therefore C is D."

If, however, we apply to the same example the second of the above rules, we get what is called a Destructive Conditional Syllogism. Thus, "If a state is well governed, the rights of the weaker are secured; but the rights of the weaker are not secured in this state; therefore it is not well governed." "If A is D, C is D; but C is not D; therefore A is not B."

It must be carefully borne in mind that we cannot in either case reverse the process. We cannot infer anything at all if we dony the antecedent or affirm (i.e., grant the truth of) the consequent. It is readily conceivable (to recent to the above example) that a state might be very badly governed in other respects where the rights of the weaker were seens, and consequently itsels not necessarily one of the consequently itsels not necessarily one of the consequently itsels not necessarily cannot be also not necessarily consequently indeed and the respective of the consequently indeed and the consequently indeed as not necessarily consequently and for the same reason we cannot a seart, because a state is not well governed, that therefore the rights of the weaker are not secure.

There are, then, only two kinds of conditional syllogisms—the one constructive, depending for its validity on the first rule; and the other destructive, depending for its validity on the second.

A Disjunctive Proposition is, as has already been explained, composed of two or more estegoricals joined logether by the disjunctive conjunctions, either, or, it states an alternative, $\epsilon_{s,s}$ owen our or other of its members must be true: $\epsilon_{d,s}$ number of the members in the true: $\epsilon_{d,s}$ number of the propositive, or mixed. Unless some one of these categories is true, the disjunctive must be fails. In addition to this, however, there must also be some opposition between the parts, $i_{t,s}$ they must be incapable of being all

true at the same time. Thus: "Either this man is mortal, or be has red bair," though exactly corresponding in form with the proposition given above, is quite useless for any purpose of reasoning.

If one of the propositions of a syllogism be disimentive, the syllogism is called disjunctive on this insertive, the syllogism is called disjunctive on this insertive. Suppose we have as the major premise, "Either A is B, or C is D," we may deny one of the categoricals in the minor, and then affirm the truth of the other in the conclusion:—"But A is not B 3; therefore O is D'; or, "but O is not D, therefore A is B." And is the same way, if, instead of being two, there were several categoricals, any one or or other other homeland proper of the control of the or other other homeland proper of the control of the remaining one (if noise than one), or the remaining one of the noise of the control of th

In most instances, however, not only (as we have already seen must be the ease; so nos of the eate-goricult true, but doily ono is true. The consequence of this is, that we are also able, if the truth of one or more of the members be granted, to deny the truth of the remainder: e.g. (referring to the above example), "But it is spring; therefore, it is neither summer, nor untumn, nor winters.

We must next speak of the Dilemma, concerning the nature of which different logicians have expressed very different views. Popularly, the dilemma is considered as an alternative argument, such that, if the conclusion of one train of reasoning be not . admitted, that of the other must be; so that one has to choose, as is said, between the two "horns" of the dilemma. This is in the outline true, though not logically accurate; besides which the "horns" may be and often are more than two in number in the arguments to which the namo is properly applied. In reality the dilemma is a complex argument, and partakes both of the nature of the conditional and disinnctive syllogisms. It may be described as a syllogism with the major composed of two or more conditional propositions (having each the same or different autecedents, and the same or different consequents), and with a disjunctive minor. It will thus assume one of three forms:-

L SDIPLE CONSTRUCTIVE.

If A is B, C is D; and if E is F, C is D;
But either A is B, or E is F;
Therefore, C iv D.

Here we have several antecedents in the major, each with the same consequent; and in the minor these antecedents being granted disjunctively—i.e., it being granted that one or other of them is true—we infer categorically in the conclusion the truth of

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the one common consequent. The following is an example of this kind of dilemma:—

If this man is guilty, he should be placed in confinement; and if he is meane, he should be placed in confinement; But he is either guilty or insue;

Therefore, he should be placed in confinement.

II. COMPLEX CONSTRUCTIVE. If A b B, C is D; and H E is F, G is H; But cittler A b B, or E is F; Therefore either C is D, or G b H.

If the criminal knew the consequences of his act, he was wicked; and if he did not know the consequences, he was from

in sur.

But he either knew the consequences, or he did not know them;
Therefore, he was either wicked or insane.

Here we are given several antecedents in the major, as before; but each has a different consequent; and consequently when, as before, we are granted in the minor the truth of one or other of the antecedents, we can only disjunctively infer in the conclusion the truth of the saveral consequents.

III. DESTRUCTIVE (always complex).
If A is B, C is D; and if E is F, G is II;
But either C is not D, or G is not II;
Therefore, citler A is not B, or E is not F.

If this man were wise, he would not speak irreverently of the Bible in jest; and if he were good, he would not do it in

cornest; But he does it either in jest or earnest;

But he does it either in jest or earnest; Therefore, he is either not wise or not good.

In this ease we have several antecedents in the major premise, each with a different consequent. These consequents are disjunctively denied in the minor, i.e., it is asserted that some one or other of them is false, and then in the conclusion it is inferred from this that some one or other of the antecedems is false,

Before passing from the consideration of hypotheticals, it must be observed (in conformity with the statement that the syllogism is the type of all reasoning), that hypotheticals can by one means or another be reduced to eategorical syllogisms, to which the dietum and other rules before given can be applied. All conditional propositions may, for instance, be considered as universal affirmatives, of which the terms are entire propositions, the antecedeut being the subject, and the consequent the predicate. Thus, "If A is B. C is D." is equivalent to such a categorical as this; "The case of A being B is a case of C being D," and then (if we are dealing with a simple constructive conditional syllogism) the minor and conclusion may be represented thus: "This present case is a case of A being B; therefore it is a case of C being D." Sometimes, too, when the antecedent and consequent of a conditional have each the same subject, the syllogism may be reduced by simply substituting a categorical major premier for the conditional one—e.g., "II Cosar was a tyrant, he descreed death," might be represented by the proposition "All tyrants deserved death," the minor premise and conclusion remaining the same as before. Some of the methods by which hypotheticals are reduced to the methods by which hypotheticals are reduced to the methods by make the production of the methods by the production of the methods by the production of the major that is not of much consequence, at it is only to show the universality of syllogistic seasoning that such reduction ever is employed.

An Esthymene is a syllogism with one of its premises suppressed. While to the two remains to be supplied may be easily ascertained by observing whether the subject of the suppressed premise occurs in the conclusion or not. If it does, the major obviously is wanting; and if not, the minor: \(\delta_{ij}, \) "Crear was a tyrant: therefore, Crear deserved death." is ovidently a syllogism in Berbare with the major, "All tyrant deserve death," suppressed the centrymene as an argument until we have both the premises before us, and see whether they conform accurately to the avilogistic laws,

The Sortics is an argument composed of a series of propositions, in which the predicate of each of propositions, in which the predicate of each state subject of the next, until finally the conclusion is arrived at, which is formed of the first which is formed or the first which is formed on and last predicate in the erries: ag_{st} . "Caius is a num; all mean are finite beings; all finite being are sentiont; all sentient beings seek happiness; are sentiont; all sentient beings seek happiness; 28 is C_{1} (3) C is D; (4) D is E; (5) E is F; therefore Caius (2)

An argument of this kind may he expanded into a scries of syllogisms in the first figure, the conclusion of each (with the next in order of the propositions of the sorites, as major) being the minor premise of the next. There will thus be as many syllogisms as there are propositions in the sorites intervening between the first premise and the conclusion; -the first being the only minor premise expressed in the sorites. Since, as we have seen, the minor only in the first figure can be particular, it follows that the only proposition in the sorites which may be particular is the first, all the rest being necessarily universal, as being major premises in syllogisms in the first figure. For a similar reason no proposition except the last can be negative; if otherwise, the syllogism in which that proposition occurred would have a negative minor, which is impossible in the first figure. The following diagram will make the process of the expansion of a sorites into syllogisms much clearer (the numbers referring to the propositions in the form already given). The above sorites will be reduced into four syllogisms, thus :-

as a means of affording security in monetary truns. A ton consists of 40 feet, and the solid contents in octions." LIGHTERAGE.—The amount of freight or hire of

a lighter or barge, LIMITATIONS.-The period fixed by law for the recovery of debts. Those of an ordinary character become void in law after a lapse of six years, noises a written acknowledgment and promise to pay has been made during that period. For bonds, dects, and judgment debts, twenty years are nevigned.

Linitee Liability.—In Registered Joint-Stock
Companies the limitation of the Habilities of cach

member for the dobts of the company to the nominal amount of his shares. LeguioATION.-A course of settlement or wind-

Lacro'z.—Subscription rooms in the Royal Ex-change, where the private underwriters or marine insurers attend for the transaction of their besi-LLOYD'S BOXDS.-An acknowledgment of indobtedness by a railway company originally given to a contractor for a portion of the line. They are in excess of the amount of debentures allowed by the Act of Parliament to the company granting them,

and derive their name from the originator, who dovised them as a plan for giving security to the boilder of the line. Having the nature of a mort-gage, and being for a portion of the original plant, they were supposed to be a first charge on the property of the company, but their legality has been called into question, and they ennues be readily negotiated in the money market.

Log Book.—A book containing a minute record.

of a ship's progress, and every incident occurring to her or on board of her during the voyage. MANDATE -A dollvory of goods to a person who

is to do some act in connection with them entirely without reward. He who delives the goods is styled the Mandator, and the receiver the Mandatory. MANDAMUS.-A writ fessing from the Court of Queen's Bench, requiring the performance of certain specified acts. It is n writ of a most extensive

remedial nature, and issues in all cases where the plaintiff has a right to have mything done, and has no other legal means of compelling its MANIFEST .- A statement made out by thes

of a vessel previous to leaving port, specifying the whole of the earge, perts of detination, etc. and navigation of a merchant'ship.

MAXIMUM.—The greatest quantity or part of anything. Flural, Maxima. MEASUDEMENT GOODS.—Merchandise on which

freight is paid by measurement instead of weight.

measurement of cash package is ascertained by taking its length, breadth, and depth. MERCHANT.—One who trades with foreign countries; an importer and experter of goods and produce.

MINIMUM.—The least quantity or part of anything. Plural, Minima.

thing. Ploral, Miniso.

Mosvoous.—A pivileged or other absorption of an entire trade or branch of industry.

Mosroale.—A pledge of fand or property by deed as accurity for money lest or owing. The person pledging is the Mortgager; the one in whose favour the deed in excented the Meripager. Musrem.-An average sample or collection of

NEGOTIABLE DOCUMENT.—A document which in its transfer from one person to another conveys to the possessor n logal right to the money or pre-

perty specified. NET.—That which remains after the deduction of all charges, outley, or allowances of any description. NOTARY (PUBLIC).-A specially authorised por-

ton who attests, copies, or translates certain decuments, proves their validity for the purpose of giving them offeet abrond, and whose province is to nete, and issue protest against, the non-neceptance or non-payment of bills. Norths of a Bild .- A note taken of its pre-

sentation for acceptonce or payment, enstomatily effected on a second presentation by a notary, asproof of the claim having been duly made.
Null AND VOID,-Of no effect.

OPEN ACCOUNT .- As account in Dr and Cr. form, exhibiting all open transactions between two parties, setting down tho amounts of those transactions that are determined but not metered, and estimating the out-tern of those still pending, so that the

the out-torn of those still pending, so that the balance shows a close estimate of the respective position of the parties concerned in the account. OPEN POLICY.—In marine insurance, where a certain sum is insured, leaving the declaration of the goods and their values to be mbsequently made. ON DIT (Ployde say).—Fixed at the beginning of a sentence to denote that what follows is a firing

OPTIONS,-Speemintive transactions on the Stock Exchange, where persons give so much per cent, for the option of buying or selling so much stock at a fixed price on a certain fixed day. Oversthams.—An excessive charge or price.

PANIC.—A sudden fright, especially when without Used commercially to denote a general

distract with regard to money matters.

PAR.—Exact corresponding value, neither enneed by premium nor depreciated by discount. PAR OF EXCHANGE.—The comparative intrinsic 2 S. 4
(2) B is C. (3) C is D. (4) D is E. (5) E is F.
(1) A is B. [A is C]. [A is D]. [A is E].
(1. A is C]. [. A is D]. [. A is E]. [. A is F].

There are also, of course, conditional sorites, in which the propositions are conditional, instead of categorical; but of these it is unnecessary to treat particularly.

Induction is, by some writers, regarded as a totally distinct process of reasoning from the syllogistic, or, at least, as ultimately depending for its whidily upon quite other grounds than the syllogism.

According to Whately, the word "induction" is vaguely used; being sometimes employed to denote the process of investigation and collecting facts, and sometimes that of deducing an inference from the facts when accertained: induction, in the former sense, being distinct, indeed, from the syllegism, but not being a form of argument at all; and in the latter sense, being, like all other reasoning, capable of being expressed in the syllogistic form. Mereover, he regards induction, and rightly, so far as it is taken to mean a process of inquiry, as quite outside the previous of Logio altegether, the office of which is not to get premises, but to see what conclusion (if any) can be drawn from them when get, no matter how So far as induction is a process of inference or reasoning, we may accept Mill's definition:—"The process by which we conclude that what is true of certain individuals of a olass is true of the whole class, or that what is true at certain times will be true in similar circumstances at all times" Or we might describe it generally as the process by which we infer a proposition to be true universally from finding it to be true in a number of particular instances. Thus, to take Whately's example:—"The Earth moves round the Sun in an elliptical orbit; se dees Meroury; so does Venus; so does Mars, etc.; therefore, all planets (the naiversal term which compreheads these individuals) move round the Sun in such an orbit." Here we have an example of inductivo reasoning. But this argument, if it be reducible to the syllogistic form, is plainly an enthymeme, being incomplete as it stands. Now it is very seldom that an instance is found of what is called "perfect" industion, i.e., one in which there is a complete enumeration of all the individuals, respecting which we assert collectively what we had before asserted separately, e.g., "John is in England; so is Thomas; so is Peter; so is Francis; all the sons of Edward are John, Thomas, Peter, and Francis; therefore, all the sons of Edward are in England." Besides, such an induction is practically useless for the purposes of inference, as we have gained no further knowledge when we have stated the truth of the universal, which is merely made up of the particulars already onumerated, and nothing more: However, in the induction commonly employed, what is meant is, not that there is a complete enumeration (in many cases that would be im-possible) of the individuals of the class, but that those which are enumerated are to be taken as a sufficient sample or number of instances to warrant' us in drawing the conclusion that what has been found true of them is true of the rest also. Bear. ing this in mind, every induction will appear to be an enthymome with the miner premise (that which contains the statement about the individuals) expressed, and cap be reduced to a syllogism by supplying a major premise, which will, in all cases, be found to be substantially the same. This major is, as given by Whately, "What belongs to the individual or individuals we have examined, belongs (certainly, or probably, as the case may be) to the whole class under which they come." The example by which he illustrates this is-from finding on examination of several sheep, that they each ruminate, we conclude that the same is the case with the whole species of sheep; and from fading on examination of the sheep, ex, deer, and other animals deficient in upper outring-teeth, that they each ruminate, we conclude (with more or less certainty) that quadrapeds thus deficient are rumin-ants; the heaver readily supplying in sease the suppressed major premise—namely, that "wint belongs to the individual sheep we have examined, is likely to belong to the whole species," etc.

The origin of this major premise, and the grounds

of its validity, are questions for Psychology and Metaphysics rather than for Logic proper. It is now generally held that it may be ultimately resolved into the Law of Causation—rather awkwardiy . . called by Mill "the Law of the Uniformity of Nature." The view of Mill, and of these who hold Nature." that all our knowledge is derived from experience. is that "all reasoning is primarily from particulars' to particulars": we toud, by the Law of Association of Ideas, to expect that what has happened before will happen again in similar circumstances. Experience soon shows us that this is often not the case, and that the only similarity we can reiv on in nature is that similar causes will have similar effects. We cannot rely on the repetition of a mere co-existence. Men believed for five thousand years that all swans were white-that is to say, that the attribute white co-existed in overy swan with its other attributes-yet the black swans of West Australia proved they were wrong. But we never have found that things happen without causes, or that similar causes have not had similar

i.c., in the words, in the one case, or extra dictionem, i.c., outside the words, in the other.

In neconance with what has been previously said of the previous of Logifs, it does not profess to teach us to "vel gainst errors and mishries in the notice of a.c. reasoning. This can only be done by a perface knowledge of the particular science or braudo of howelonge to which to premise- of our argument relate; but when the premise- me half down, then thu observance of the rules of Logic, as a test, will cusare that no error shall error just between them and the conclusion.

The great division of fallacies, then, is into those in the form and those in the matter; into those in which the conclusion does not follow from the premises, and those in which it does. It is not, howover, always possible accurately to datermine to which of these two classes a fallacious argument should be referred. Thus in enthymemes it is often a matter of choice whether the premise left to be supplied should be taken to be one which is not true, or one which does not prove the conclusion. To take an example given by Archbishop Whately: if a man argues from the fact that a particular country is distressed, that it is under a tyranny, his suppressed premise may be either "every distressed country is under a tyranny" (which is plainly false), or "every country under a tyranny is distressed" (which does not prove the conclusion, as the middle term will be undistributed in both premises). Now, If the farmer member be the one meant to be supplied, the fallney is to be referred to those in form; if the latter, to those in the matter. This illustration shows how hard it is to attempt may classification of fallacies, to which no exception can be taken. The outline of the classification which we shall adopt will be that of Archbishop Whately, and many of our examples will be taken from the same writer, whose chapter on Fallacies is probably the most valuable and interesting of his whate work,

We have seen that in every argument which professes to resume the syllegistic form, the conclusion either does or gloss not follow from the premises; and that, in the latter ease, where the combision does not follow from the premises, the fault lisned in our imperfect knowledge of the ashigismatter, but in the reasoning almo. Hence, as those follows are volations of the raise, which logic lays down as those to which all sound thinkers are bound to content, we may call them lagitar

The most plain and obvious logical fallacies are, of course, those which arise from the violation of some one of the syllogistic rules already given; and upon them it is unnecessary to dwell here at

greater length. It may, however, be remarked, that several unsound arguments not uncommonly to be met with may be referred to this head, Thus, if a person argues that a certain proposition is false because it has been successfully demonstrated that the grounds or premises upon which it was supposed by his opponent to rest are false, such a person would be using an unsound argument, in which he would be guilty of an illieit process of the major term (which we have already explained) -e.g., if the ground adduced to prove the existence of a God was that it is universally believed and an instance where no such belief prevailed was cited, then, if an attempt was made to argue that this dispraced the existence of a God (instead of merely overthrowing the single proof which bad been advanced), the fallney might be represented thus: "Whatever Is universally believed is true; the existence of a God is not universally believed; therefore it is not true," So also the follney of inferring the truth of the premises from the truth of the conclusion may be staled as follows: "What is universally believed is true; the existence of a God is true; therefore it is universally believed." This is obviously nu instance of undistributed middle.

The middle, however, is often ambignous, not from being undistributed, but from being used in u different sease in each premise. This gives rise to n very large class of fullacies, to which no one name can be assigned that will comprehend all. When the inddille term is thus ambignous in

sense, as lawing in Medj. from its own equivonal mature, two significations, we have what is called the Pollace equivocation as I topic distance of the pollace of the Pollace equivocation as I topic distances. Further are light; there fore forthers are restrictly to larkness.—In which example there are, strictly specified, flow terms. No me would be described in such a case as this one; but it must be remembered that the ambiguity will often be less patent and more likely to escape observation from the premises being placed at a considerable distance from each other in the course of a long arequent.

In the falley which is mentioned by togeleans under the titled of Educies amphiliate, the unbligality arties from an amphiliate sentence, i.e., one which is expalse of two meanings, not from the double same of any of the words, but from its admitting of a double conservation. "Pyrmths the Romans shall, I say, subdume" (where the nominative to "subdume" may be either "Pyrtus" or "the Romans") is an instance of such a sentence; but the Rogitals humange does not furnish so many of them as the Latin and others likelt, and the falley is therefore not often to be met with in this shape.

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Primary language, however, is very elliptical, and thus terms not soldom become practically ambiguous, leding differently applied on different occasions, athough there is no real difference in the scene of the terms themselves: e.g., "faith," which have in itself unto meaning, is employed by the votary of each different-religion to denote his own peculiar form of beilef. This may lead us without caution into arguments somewhat resembling the fallow their mentioned.

An ambiguity arising from the context also gives rise to the fallacies of Division and Composition. In the fallney of composition the middle term is used in the major premise in a distributive, and in the minor in a collective sense: e.g., "Two and three are odd and even; five is two and three: therefore five is odd and even," where it is plain that the middle term "two and three" is ambiguous. denoting, as it does, in the major premise the two numbers taken sevarately, and in the minor taken teacther. This fallacy is employed whenever, as is not unfrequently the case, a person, after establishing some truth separately concerning each member of a class, then infers the same to be true of the whole collectively. This is the same thing as contending that, because it is not improbable one may throw a six in any one out of a hundred throws, it is not improbable that one may throw a six in each of them, i.c., a hundred times running; the abenrilty of which is plain: but yet, hardly any fallney is more common or more likely to deceive than this. The fallacy of division, on the other hand, occurs where the middle term is first taken collectively in the major premise, and then distributively in the minor-e.g., "two and three are five; two and three are two numbers; therefore five is two numbers." Here the middle term is in the major premise, "two and three" together, and in the minor "two and three" taken separately. The ambiguity of the word "all," which means sometimes "every one separately," and sometimes "all together," not unfrequently gives rise to this fallney of division.

There is also another kind of ambiguity occasioned by the context—wire, where the middle term is used in the major premise to signify something considered simply in itself and as to its essence; and in the minor for the same thing, with some of its concleants taken into account along with it. The example commonly given of this, the Filleder Accidenties, as it is called, in this: "What is now in the condense taken its called, in this: "What is now in the same thing." It is the property of the same thing with the same through the

for the same thing, with the accident of "being dressed "appended. If the accident is understood with the middle in the major premise instead of in the minor, logicians give the fallancy the somewhat lengthy Latin name of Billacis a dictor secundum quid ad dictum simpliciter, i.e., the fallancy of arguing from what is said with a certain accidental reference to the same thing said absolutely.

Under the head of ambignous middle we may also class the Fallacia Figura Dictionis. "This," to quote from Archbishop Whately, "is built on the grammatical structure of language, from men's usually taking for granted that words belonging to . each other, as the substantive, adjective, verb, etc., of the same root, have a precisely correspondent meaning, which is by no means universally the ease. Such a fallacy could not indeed be even exhibited in strict logical form, which would preclude even the attempt at it, since it has two middle terms in sound as well as in sense : e.g., ' Projectors are unfit to be trusted; this man has formed a project; therefore he is unfit to be trusted': here there is an assumption that he who forms a project must be a projector: whereas the bad sense that commonly attaches to the latter word is not at all implied in the former." There is a similar want of complete correspondence in the meaning of "presume" and "presuming," "art" and "artful," "design " and " designing," and many other words.

The last of the logical fallacles we shall notice separately is the Fallacia Plurium Interrogationum, or. "fallacy of several questions." This consists in asking two or more questions, really distinct, which appear to be but one, so as to entrap an opponent into giving but one answer, which, though only applicable to one of the questions, may be taken as an answer to the other or others. The way in which it must be defeated is by giving a separate answer to each question. A good instance is given by Archbishop Whately of its employment by a Parliamentary Committee in 1832, before which a witness was asked "how long the practice had ceased in Ireland of dividing the tithes into four portions"; two questions being thus combined -1. Had this practice ever existed? 2. If so, how long had it been discontinued? Sometimes the ambiguity which gives rise to this fallacy lies not in the meaning but in the distribution of a term : e.q., "Did this man net from such and such a motive?" which may mean, was it one of his motives? or, was it his sole motive? So also the question, "Has a state a right to enforce laws?" is ambiguous from the fact that "laws" may mean either "some laws," or "any laws, without exception," i.c., may be understood as undistributed or not.

BRITISH COMMERCE.—VI.

TIMBER (continued).

FROM Brazil and Rio de Janeiro comes rosewood, so named from its odour while still fresh. Learnives in planks about 12 feet long, with a flat and a rounded side, each being apparently half of the tree trunk. The chief use of this wood is for library and drawine-room furnishings.

Walnut, in the days when malogany and rosewood were still unknown, held the highest place in the manufacture of furniture. It comes from Italy, and, besides being used extensively for tables, book-cases, and the larger mricles of furniture, is aboundle into gun-stocks. From America comes black walnut. It has no cranamental value.

The main bulk of building timber comes from the pines and firs of North Europe and America. To enumerate the different trees alone whose wood supplies my material for the builder and carpenter and cabinet maker would occupy too much space, and the instances given, with the additional notes on other woods in Commercial Botuny Issonse, must suffice.

In the early part of the present century heavy daties were placed on Continental timber with a view to encourage the trade in American timber. Here is what a contemporary writer set himself to prove when the irisomeness of these duties was being felt :- That this country suffered sorious loss through the high price and bad quality of North American timber as compared with the Baltic; and that the Colonies, so far from being benefited, were in fact greatly injured by this forced trade. Among the arguments against admitting the Baltic timber duty free was one to the effect that the Baltie merchant would take our money instead of our produce in exchange for the timber we purchased of him. This is an argument very much like some that may be henrd even at the present day, and here is how the reviewer answers it :- " But how is it proved that the Baltie lumberer will not take our produce in return for his wood ! By the fact that he has not bought our produce. But why has he not bought our produce? Because he had not the means. Do we pay for Swedish iron in money? Supposing the Baltic merchant to take money, what would happen? Would be eat his money I would be wear it? He would purchase with it the commodities he wanted, and these could be, and would be, most cheaply furnished by England. And can that money have been procured in England, except by the sale of some kind of British produce to somebody? Suppose the Baltie man would take only Turkey coffee; would anybody object to a transit trade in Turkey coffee? Why then in gold or silver? The truth is,

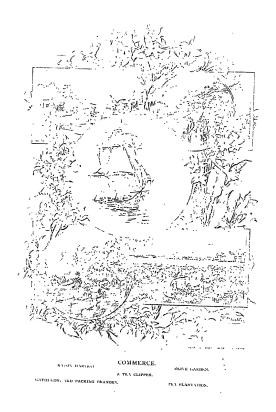
that the market for our produce would be materially increased by the measure (the measure abolishing the daties). The North American Colonies would still have the purchasing power they now have, and the Baltic people would have acquired a power which they ind not before."

An idea of the difference in quality between American and Ballic timber may be gathered from this satement, made before a Parliamentary Committee to inquire into the timber trade in 1820-21. Said the writness:—"About the year 1756, to the best of my recollection, there was a certain number of frigates built of the fir of the Baltic, and their raverage durability was about eight years. About the year 1812, there was a considerable number of frigates built not of fir, the growth of the Korth American Colonies, and their average durability was used to the control of the dependent of the control of the

In lumber districts, such as those in British North America, it is usual to fell the timber in the winter time. The spen work in gangs, and the chief or foreman allots to the rost their work and selects the pince for working. In fixing on a spot accessibility from roads and rivers has to be considered. as the cost of transport might exceed the worth of the timber. As described by a visitor, the foreman then "informs the liner who leads the gang of timber makers. He with his assistant the feller make their way to the place, and, selecting their rree, ascertain how it lies, and which way it is best for it to fall "-determined by the lay of the land. the crooks of the tree, direction of the wind, and so on. "Having done this and cleared away the brushwood, which would interfere with the swing of their long-handled axes, they place themselves one on each side of the tree, and assail it furiously. making the chips fiv on every side, and causing their blows to resound through the forest."

After felling the tree, the next point is to get as much timber ont of it as possible. It is consequently topped as far from the butt-end as possible, and then it is lined-an operation of such importance that a good liner always commands the highest wages. "Planting one end of the line at the top of the stick, the feller makes his way to the batt, and there holds the line awaiting the directions of the liner, who, mounting the log, takes a general survey, and just laving his measure across the tree to see what sized stick it will make, strikes the first lino by eye. He then lays off the line for the other side by measure, dotting off with his chalk the spots through which the line should run, at butt, centre, and top; and after one more last look the second line is struck and the business is completed."

After the liner come the scorers. These notch the log to within half an inch of the liner's marks



and at regular intervals, and split off the blocks between. After the scorer comes the heven who levels the faces of the log. Such is the emidoyment that men away in the heart of Canadian ferests pursue in the winter. They are away from home, and live in rude shanties made of logs. Round three sides of one of these shanties are usually arranged the beds, the fourth side being devoted to culinary purposes. "One end of a narrow shelf, covered with tin plates and dishes or cups, serves for butler - pantry; the other end supporting two or three huge round loaves, fifteen inches in diameter and six inches thick, together with numerous pieces of cold boiled pork, was the larder; while the scullery was in the corner below, where were the great nots for boiling the pork and baking the bread. Scated on the bench between the beds and the caboose, with his legs tucked up under him, an immense loaf on one side and an equally large pot containing fried meat on the other, with a large slice of bread in his hand, and a piece of meat under his thumb, without even the decency of an intervening thumb-piece, was the presiding genius of the place, the cook, pleasantly occupied in picking his teeth with his pocket-knife."

After the trees have been felled and hewn, they are collected on the river banks, where they remain until the breaking up of the ice in spring, when they are floated down stream in rafts.

Immense tracts of territory are still under forest both in Europe and America, among the countries with the largest acreage being Russia, Sweden, Germany, Austria, France, Hungary, and Norway; while in America it is estimated at 380,000,000. Yet, with such vast forests, there are those who are apprehensive as to the world's future timber supplies. The mere extent of territory covered by forest does not convey an accurate idea of the stores of existing commercial timber, as much of the produce of wild forests would be unsuited for working up. Even in America, where forests were considered a nuisance not so very long ago, the planting of trees is enconraged, and the day called Arbor Day is now quite a national institution; while in many parts of the British Empire the utmost care is taken not only to use wisely the timber already maturing but to plant wisely for future generations.

FRUIT.

Our fruit imports are divided for fiscal purposes into two great classes—dutiable and duty-free fruits. Those fruits upon which a duty is levied are: currants, figs and fig-cake, plums and prunelloes, dried or preserved plums, prunes, and raisins.

All other fruits that enter our ports do so duty-free; such are apples, oranges and lemons,

banance, pine-apples, and so forth of which immense quantities are yearly importal.

Of raw apples our total imports in 1857 were 4,000,00 bushels, of the declared value of £1,000,000. Those came chiefly from :—British North America, Belgium, United States, France, and Holland.

Oranges arrived here to the extent of \$,700,000 bushels, of the declared value of £2,000,000; and lemons to the extent of 1,500,000 bushels, of the declared value of £400,000. The leading countries whence these supplies come are: Spain, Italy, Egypt. Azores, Portugal, and Tarkey.

Other raw-fruits, duty-free and mnenumerated, amounted to 1,700,000 bushels, of the value of £695,000. The bulk of this came from Spain, France, Germany, Holland, and Belgium. should not forget also to mention cherries, to the extent of 300,000 bushels, of the value of £178,000; plume to the extent of 1,000,000 bushels, of the value of £490,000; pears, to the extent of 1,000,000 bushels, of the value of £370,000; grapes, to the extent of 990,000 bushels, of the value of £490,000, Of dried fruits, pnenumerated, the larger part came from Turkey. Of fruits, preserved without sugar and unenumerated. Italy contributes more than the half, and important quantities come also from the United States, British East Indies, France, and Spain.

Among dutiable fruits, the first place in point of quantity and value is held by currants. These came to us to the extent of 1,000,000 cevt., of the declared when of 2,100,000, Greece particularly contributing the whole. Figs and fig-cake come beider from the whole. Figs and fig-cake come beider from served plans, from Germany, Portugal, and Austria; prunes, from France. Raisins were imported in 1876 to the extent of 600,000 cevts, to the value of 21,000,000, and came chiefly from Spain, to the certes of 250,000 cevts, to the value of 245,000, and from Turkey, to the extent of 509,000 cevts, to the value of 250,000 cevts, to the value of 250,0

Notwithstanding the immense quantity of fruit represented by the foregoing figures, there are yet those who regard the import fruit trade as only in its infancy. Improved means of communication, improved methods of preserving perishable article, and improved processes of cultivation in foreign countries are looked upon as likely to make us independent of the seasons.

The edible banana is cultivated chiefly in Central America, Mexico, United States of Columbia, Brazil, Peru, and the West Indies. The plant requires warmth and moisture, and is grown from slips usually planted as shade for other crops. Its leaves attain as great a length as six feet and a breadth of a footand abid. The limit intended for expertation is plutted before it is quite ripe and while still grown, the rich gobies colour in which we know it coming on an its being legs. The cithidap portion of the fruit is highly naturition, and centains a large amount of sugar and starte. It is simportant as are naticle of food in the tropic, and grows in great abundance. Similar to the lamon, though an analysis of the simportant and contains a sum article of food in the tropic, and grows in much cearser and larger, it the plantation. It does not come to this country, and is confidently and the form of the simport to matter users it and the simport to matter users it makes the simport to matter users it to miss to see the simport to matter users.

Gitting grow in the open in India, Jarrous, Gibias, Persia, annual tio Mediciraneous, in Picolis, and the West Indies, and are the fruit of an everprese. They are chiefly seed for making cambled peet, the centre of which trade beat Leghorn. The peet is also shipped here in brine in earls. The first grows to a great size. Indy that thick skin is calten re-a preserve. From the india, the, isolationed unco-smalled oil used for purpose of perfumery. This off is sometimes confused with ethoration of, which is cheep and largely used in perfumine soaps. It is from a kint of grees, and is imported in large into

The great currant-producing country is Greece, and the district three untiley levoted to it are Zaute, Cryladonia, Itleva, and round alout the currant post of Patters. This world-known finit is the berry of a species of trapped ine, and it has been used in times of seartly of the white-grasp by French vancounders. The plants are failed in the integrals in now about the supergrasp in the submitted of the plants of the p

After ripeding the surrants, which grow in lunelamelies in for and a half bong me gathered and land out on the ground to dry in the sun. While drying they are turned repeatedly, to present them from francitum; and to repose all parts of the layers. His running operation also detaches the berries from the stears. They are then put into foot. Formerly formula was the relief place for the cultivation of currants; more the more, which is a corregion of Celuida.

The obse-palm, bough found in its most four-faiing condition in countries that are noted for their absence of run, will yet not hear fruit unless it be well watered. It may be grown both from seed and from sheets, the latter producing the best and most preditable trees. In laid a down years from planting the trees began to yield, and continue found to from 1.20 to 15 years. The yield of a huntle of from 1.20 to 15 years. The yield of a bounded of the planting of the planting of the bounded of them 2.01h. The best date, known as "failed takes, owner from Nuth Africa, Adries, and Tunis, and to be in prime condition are gathered just before ripening, being exposed to the sun for a few days to complete the ripening process. The dates that arrive here in a caked or crusted state are said to be damaged through having been allowed to ripen on the trees and drop to the ground. They are so cheap, however, and abundant that damaged dates are not likely to command the notice of my one; even those that are perfectly sound have scarce any care expended upon them. The palms are cultivated in groves, and along the Emphrates and Shat-el-Arab these grove- extend for 150 miles on both banks so as to be convenient for water, The trade in dates has led to a large industry in Norway, whence boxes to pack them in are exported hi ship-loads. These boxes are not put together until they reach the plantations. The sides, trues, and hottoms of each bax are tied together as so many boards.

Beobles Its miritious frail, the date-paint also provides a useful hard wood, its sup, formatel, provides a winn, its seeds an oil, and its beaves are converted into many articles of domestic utility. Not long ago it was particuled in this country that good coffee could be made from dates, and at so cheap a price that the voffee plant would us longer be possiblely editated. Samples of this secondical bale-coffee were personneed to be indelinguishable from utilities of lower. It utilizately transplied that the complete was the conference of the contact of the control of the conference of the second of the control of the conference of the second of the control of the control of the united of the control of the control of the united of the control of the control of the conlination.

From the fig-tree two crops are annually gathered -one at the beginning of summer from the previous autumn's laids, and the other in autumn from the spring buds. The latter is the best. When ripe, the finit is plucked and exposed to the sun and air to dry. If left to dry in their natural form and packed without force, they are known by the lerm "natural"; If, however, they be listened during the drying and packed in layers with considerable force in small hoxes, they become what are known as "pulled" figs. The best figs are those from Surrua and branded "cleme," Turkish for hand-picked. The pulp of a good fig should be dark, and the skin thin, allowing the seeds to be seen through it. Figs. are often roasted and ground into a powder to whilterate coffee with.

The bonon of commerce is cuttivated chiefly in Cu-iea, Florida, Italy, Portogral, Sieily, and Spain. It is the fruit of Citrus Limonum, a native of the Hamalayas, generally grown conjointly with the orange. Two crops are gathered annually—a light crop in early winter and the chief crop in September. It is princh calcily on account of its juice, which is much used in efforcescing draughts, and provides us with an everful anti-scorbutic.

Lines are a species of counge, and are most successfully relitated in the West Inflies. Midnite is essential to the life of the plant, which begins to yield about six years from the time of planting the seed, and continues to bear for upwards of a dozen grant. The first is placked frequently during the year. It is then taken from the plantitudes to the tractice, where it is cut into affect by machine of a superfor quality is put. strunghway into casts and headed down; that from an inferior quality is belled down to within a tenth part of its original bulk, and utilimately converted into circle acid.

Of the common orange there are two leading kinds-the bitter or Seville orange and the sweet or Portugal orange. Both varieties are extensively cultivated throughout the Mediterranean, the Azores, West Africa, China and Japan, Australia, Fiil, West Indics, Central America, Brazil, Mexico, and California. Warmth and moisture are the elimatic conditions most essential to the successful growth of the plant, which is propagated from transplanted young plants reared from wild seed-theso plants being grafted with shoots from cultivated trees. At the final transplanting the distances maintained between the plants vary; in Italy they are 18 feet. in Trinidad 25 feet and in the Azores 80 feet, the intervening spaces being occupied by subsidiary crops such as melons, or whatever will not obstruct the light ' and air from the orange plants, which with proper care will continue to yield fruit for seventy years.

From the rind of the orange an oil used in perfumery is distilled, and another from the flowers. Boiled in sugar, the neel is also candied.

Pine-apples are the fruit of Ananassa satira, a plant that is found in a wild state in most tropical countries, but is enlitvated mainly in the West Indies, It is reared mostly from suckers, and begins to bear about a year and a half after planting. The suckers are planted at intervals of about 2 feet apart, and require periodical hoeing. The fruit is plucked while still green and allowed to ripen on its way to the market. The best comes from the Azores, and large quantities, cannod, are sent from the West Indies. The cultivation of this plant is now being pursued in the Australian colonies. The juice of the pine-apple, when eaten in the sun, burns off the skin of the lips and gums when eaten. In the Philippine Islands the pine-apple plant is cultivated for its leaves, which yield a valuable fibre which makes good paper and ropes, and is woven into a beautiful fabric, known as pina, and used in ladies' dresses. · Raisins are simply dried grapes, chiefly produced

on the Mediterranean borders of Spain. From here two kinds are sent-muscatels, used as desert, and those from Valencia, used in cooking. These known as sultanas come from Turkey, and still larger specimens, Damascus raisins, from Damascus One mode of preparing raisins is to cut the stalks of the grape bunches, when ripe, half through and leave them hanging to the vine to dry. This the sun and air soon accomplish, and leave the fruit with all its flavour and its natural bloom. Another way is to lay them out on sloping floors, exposed to the on and covered with pebbles. The fruit is then put under cover and sprinkled with a solution of potash, which makes the sugar of the grape candy. and so produces the little sweet lumps so commonly met with in raisins The usual treatment is simply to dip the bunches into a cauldron full of boiling lye, the lye being a solution of wood-ashes and water. The different qualities of raisins are due to the different physical conditions under which they are grown, and the different methods adopted in enring them.

Neatly ball of our imports of raw applears from British North America and the United States. These apples, now so famous, are the fruit of descendants of imported trees from the Old World. The first trees known to bear in the New World were on Governor's Island, near Boston, and are recorded to have yielded ten applies on Getberr 10th, 1633. In the following year the first American narrary was established near Salem, Mussachesstit, cross America, within a bell 100 miles to the north and 100 miles to the south of the great lakes, never loses sight of orchards.

The apple crop is gathered in the autum; those intended for export being hand-picked from the intended for export being hand-picked from the saferand carefully packed in barrels. An apple that has saferad the slightest bruies is rejected, as it was saferad the slightest bruies is rejected, as it was saferad the slightest bruies is rejected, as it was to be the pigs or cattle. Others that may have been damaged, or arm not of sufficiently high elamenter to attack the buyers, are pared, cored, and dried during the long evenings of the winter months. The refuse or palp from the cider-presses supplies the apple-seeds recourted by the nurserymen.

METEOROLOGY. — IV.

THE PRESSURE OF THE ATMOSPHERE AND ITS
EFFECTS UPON WIND AND WEATHER.
THE division of winds into constant or trade

winds, prevalent winds such as the anti-trade winds, periodical winds or monsoons, and local winds, and their geographical distribution, have been already dealt with in our lessons in Physical Geography (Vol. L., p. 115-6); but mention may be made here of certain local winds which have received distinctive names. In Switzerland, the Film is a dry hot wind coming down the Ales from the south. On the Italian side of the mountains it is charged with moisture from the Mediterraneau; but, meeting the mountains, it is cooled and parts with this moisture, and, de-cending some thousands of feet on the Swiss side it is warmed and takes on moisture as it comes down. Similarly, the Scirocce, or south-east-wind, is hot and dry as it descends from the interior of Africa to the coast and to Malta, though it then takes up moisture from the Mediterianean. In Spain it Is known as the Solano, and is still charged with the dust of Africa. The Harmattan, a hot east wind from the interior, experienced on the west coast of Africa, is of similar prigin. Conversely, the cold northerly winds from the Alies sonthwards are known as Mistral in Provence, Tramontana or Settentriane in Italy, and Bora in Dalumtia.

Though a great variety of circumstances may affect the beaf condition of the whal at the crutification both as to three-line and us to force, so close is the counterion between the more widespend functuations of atmosphere pressure and the main movements of the utilitate It is haid down as a fundamental principle of metsonderey than "Soderstand principles" metsonderey than "Soderstand principles" in metsonderey than "Soderstand principles" in the united of the principles of the principles of the principles of the time-state."

As to direction, as we have seen, the wind is not parallel to the solar, but include from 26 to 10.5 from it towards the nearest low-pressure area. This low-pressure area, according to Buys Ballot's law, will, in the northern hemisphere, be always to the left hand if you stand with your back to the wind, and to the right hand in the sunthern hemisphere.

As to velocity, the force of the wind is roughly proportional to the clusioness of the isotoris, this classeness being measured, not by the number of infless between them, but by the barometric gradient or slope measured at right ungles to the isolaric lines. Not onts, however, does the direction and velocity

of the wind depend upon the differences of pressure which the bolds represent, hart the condition of the weather, using the term "weather" in the more clored, sain, etc., a lab dependent upon them, Whits, however, it is easy in many cases to refer back the direction and velocity of the wind to its real cames, of which the isolates are merely a symptom, in dealing with weather it is found better as a matter of practice to content ourselves with an apparently empirical association of certain forms of isobaric curves with certain conditions of weather. without attempling to revert to the complex causes of which they are the symptoms. Weather is not directly associated with the closeness of the isobars, but with the shape of their curves-i.e., not so much with the varying amount of pressure as with the distribution of the pressures over neighbouring areas on all sides. We have thus an emidrical method of weather-progno-tication in which we content ourselves with considering the isobacic curves as laid down on the recent barograms. Of the seven chief forms of isolars, no special forceasts can be associated with "V-shaped depressions" or with "cols," A V-shaped depression, known for brevity's sake as a V, is a V-shaped bend of an isolar baying lower pressure between the two arms of the V than along them or out-ldu them. The term "col" is used in meteorology in a sense analogous to that in which we employ it in geography, a col on a weather-chart being a short and narrow area of low pressure between two antievelouss, just as in a mountain-clain we apply the term to a 1988 between two peaks, or low ridge at the heads of two diverging valleys.

With each of the other live chief forms a particular hind of weather is very constantly associated; so we may describe the form of the isobars and the resulting weather together.

A cacleac is a series of concentric isobars surrounding an area of low pressure. If these isobars are close together-if, that is, the gradients are steep--the cyclone may produce storms; but there is no difference between such steep evelones and more wide-spreading ones save that of intensity, The curvature of the isobors in a cyclone is soldon exactly circular, being more often eval or elongated in the direction in which the whole system of circulation is travelling, which in the British Isles is generally towards the north-east. This clongation of outline gives us a freet and a rear, a right and a left side to a eyelonic system. As the system advances on its course, the bacometer falls at its front and rises more or less at its rear, so that there is a central line of lowest pressure crossing the path of the cyclone, or rather crossing the longer axis from front to rear, which is known as the trough. Speaking generally, the wind rotates round the centre of the evelone against watch-hands. Thus, if the cyclone be travelling north-custward, the wind in front will be south-easterly; further round, east-north-east, as far as the trough; then northnorth-west to west in the rear; and south-west to south-east round to the front again. In front the wind blows rather across the isobars; but in the

rear of the trongh it is parallel with them. Its velocity along any part of its course will depend, as we have seen, only on the closeness of the isobars Over the whole front portion of the cyclone-system the weather will be muggy and oppre-sive, the sky gloomy, and the clouds stratus, merging outwards into cirro-stratus and backwards into strato-cumulus. and cirrus. The advance of the front of the system will be marked by a watery appearance of the sun. a pale moon, restlessness in animals, rheumatic and neuralgic pains in man, the aching of corns or old wounds, and the rise of bad odours from drains, followed by nimbus-cloud and rain, at first in a drizzle and showers, and then steadier and heavier. Then, after soualls and clearing showers in the trough of the evelone, with patches of blue sky, cumulus cloud with windy cirrus on the margin of the system, the weather in the rear of the evelone becomes cooler, drier, and fresher. Another popular prognostic connected with the front of the evelone is the occurrence of halos round the sun or moon, a break in the halo indicating the quarter whence rain, or snow, and wind may be expected. This is explained by the fact of halos being generally seen in the south-west or west when the sun or moun is low and the lower part of the halo being lost in the gloom on the horizon, whilst it is from these west and south-west regions that most of our storms approach. The proverb, "Do business when the wind is north-west," alindes to the cool, dry, exidiarating condition of the air at the rear of a evelone, when we no longer suffer from rheumatic and neuralgie annovances.

A secondary cyclone may occur at the edge of a primary or true evelone or at the edge of an antieyclone, and its course is usually parallel with that of the concentric system. It consists in a rounded loop in the isphars like a wide U and enclosing a low-pressure area. Such a loop in isobars between straighter ones brings the edges of the loon nearer the straight isobars, so that the gradient is steeper, and, consequently, the wind is stronger round the outside of the U than within it. The front of an advancing secondary evelone is marked by halo and gloom; its outlying sides with straighter isobars, by cirrus; its loop, by gusty winds and heavy rain; its centre, by a steady downpour with calm air; and its rear, by irregular cumulus clouds. Thunderstorms commonly also accompany this form of the isobars, and may cause considerable and rapid barometric variation; but one of the chief regularities of secondary evelones is the occurrence of continued rain with a steady (and not with a falling) barometer.

An anticyclore is an area of high pressure surrounded by more or le-s circular and wide-apart isobars. Such a system, unlike most cyclones, is often stationary for many days. The leading characteristic of the weather associated with it is calm, though round the outskirts of the auticyclone area we have cirrus cloud and light winds blowing spirally outwards with watch-hands. With this cahn air or light winds we get what is known as radiation weather, weather, that is, when temperature and sky are mainly determined by the unobstructed radiation of the sun's heat by the earth. An anticyclone means fine settled weather. This allows the diarnal variations due to our earth's rotation and similar local variations, such as seabreezes and land-breezes, to produce effects which are far more marked than they would be at my other time. In the summer, indication weather is marked by early morning mists in the valleys, dispersing as the sun rises, and a very hot cloudless day, followed by sunset mists, heavy dew, and a cool night. In wluter, the morning mists may be represented by fog ; though the day become clear. it may, as the sun never rises high, remain cold and frosty, and the beavy dew may be replaced by rime; the diarnal variation in the direction of what little wind there is, the "veering with the sun," or becoming more southerly null westerly as the day advances, which is generally recognised as a sign of fine weather. Other popular antleyelono prognostles are: "If mists soon vanish," "if dews continue heavy in hot weather." "if sea-birds fly far out to sea. or rooks for from home," or "if bats fly about soon after sunset," the weather is likely to remain fine.

Unlike a secondary evelone or a V, a redge, or wedge-shaped isobar, has an area of high pressure between its arms. Such a wedge will lie between two cyclones, travelling onwards with them, and in our latitudes will point generally northward, so that between the two cyclones is a line, known as the crest of the wedge, broadly speaking at right angles to the nath of the evelones, along which the barometer is at its highest. Unlike an anticyclone, a wedge is never stationary; so that the changes of weather that accompany it are only temporary. As a northward-nointing wedge comes on from the west, the wind on its front or eastern side will be north-westerly, the sky will be blue, the air dry, the day beautifully fine, the sun burning, distant objects clearly visible, and the glass rising. At might, we may have one of those white frosts which popular weather-lore tells us never last more than three days, or we may see, as mentioned in the "grand old hallad of Sir Patrick Suence," "the new moone wi' the auld moone in hir arme," the earth-shine or reflection, that is, of the earth on the dark part of the moon. Then, while the barometer is still rising, halos are formed and strings of cirras cloud, popularly known as "Noah's Ark," make their appearance. A thunderstorm or heavy shower, may follow; and then, while the glass begins to fall, the are four types of weather, known, from the wind that prevails in each of them, as the southerly' westerly, northerly, and custorly.

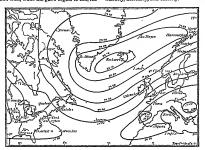


Fig. 12 -May showing Caplone over Incland and small Anticactores over Spain and the Banebe,

sky is overeast, the wind backs to south-west, and drizzling rain marks the passage of the wedge into the cylone that follows it.

Straight isobars are generally but a temporary condition marking the approach of a cyclone. In the neighbourhood of the highest pressure the sky will be blue; but as we approach the lower pressure. feathery errus will occur and a blustering wind, whirling the dust and beating down the smoke; distant objects will appear as visible while the sky is cloudy as they do in the clear weather at the approach of a wedge, and distant sounds will be strikingly andible. Still nearer to the lowest pressure, the clouds collect into firm strato-enumber from behind which the sun's rays may stream down. often with a lurid light, which effect is commonly known as "the sun drawing water." Though when the isolars are straight, we generally say that the wind is keeping off the ram, we do sometimes have light showers if the gradients are very steep; but in any case, rain is likely to come soon, as the straight isobars pass into a cyclonic system.

In the temperate zone the weather is far more complexly variable, or, as we feel tempted to say, more capricions, than in the tropies; yet it is said that in the British Isles and Western Europe there The seatherly type is most common and porsistent in winter, its persistence rendering a winter mild. It consists in a stationary anticyclone to the east or south-east of Britain, cyclones from the Atlantic nashing it towards the north-east.

The excelely type, the commonest at all second and throughout temperate regions, is when the trapken helt of undirectiones lies to the south of Partian while cylones from the Atlantic travel castward or north-eastward, ellier traversing Deinig, or passing away northward and giving us fine dry weather or even drought.

The northerly type, the converse of the southern type, rarely occurring in autumn, consists mainly in an anticycloue over Greenland and the northern Athuric, whilst cyclones form over Northern Europe and secondaries over Encland.

Lastly, the enterly type consists in an anticyclone over Scandinaria, whilet evolutes pass it southers ward, eartward, or sometimes westward. This type is in most frequent in winter and spring and leaving is most frequent in winter and spring and leaving in the British Joles it often pecisists for two or three works continuously, accompand by destructive casterly gales, to which, indeed, are the nearly one-half of the wreeds of our const.

GREEK .- XXIII.

[Continued from 7. 230]

VERBS IN -44 TREATED IN DETAIL. HAVING given the general form of the verbs in - µ4, we will now pass them in review, dividing them into certain classes, and thus affording aid to fix them. with their several parts, firmly in the memory. First of all come

VERBS IN -PA WHICH SET THE PERSON-ENDINGS IMMEDIATELY TO THE STEM-VOWEL.

. Verbs in a., as i-orn-ut (ZTA-). · 1. si-yon-us. I lond (XPA-), sayodyas, fut, yongo,

nor: Exensa: mid. I borrow, fut. xensouau (nor. expandum was in this sense avoided by the Attics). To the same theme belongs- 2. xpn, it is necessary, it behaves (opartet in Lat.); stem XPA- and XPE- : subj. 'you, int. yours.

part: (rd) xpew, imperf, expnp or xone; ont. you'n (from XPE-), fut, you'det. "

3. and you, it is sufficient (Lat, sufficit); else formed regularly from XPAΩ; inf. anexpip, part. ano-- χρών, -ώσα, -όν; imperf. ἀπέχρη; fut. ἀποχρή-· σει; αοτ. ἀπέχρησε(ν); mid. ἀποχρώμαι, Ι con-

enme, I waste. anoxphobas follows xpdopas . 4. δείνημι (with acc.), I are useful, I benefit (ONA-), inf. drawdyas (the imperfect is wanting); fut. δνήσω; nor. ώνησα; mid. δνίναμαι, I have an advantage, fut! origones; nor. ώνήμην, -ησο, -ητο, and so on; imper. δνησο; part. defineres; opt. dealune, -aio, -aire, inf. branθαι; nor. pass. Δυήθην, less frèquently

defuny. The other parts are supplied by ώφελείν, to benefit.

 πί-μ-πλη-μι (ΠΛΑ-), I fill; inf. πιμπλάνει; imperf. eniundny; fut. nafere; perf. nenanna; BOT. Endnoa; mid. I fill for myself, whundanan, πίμπλασθαι; imperf. ἐπιμπλάμην; fut. πλήσομαι; nor. έπλησάμην, perf. mid: or bass, πέπλησμαι; · aor pass. endigeny.

(The u in the reduplication of this and the following verb is commonly dropped in combination when a u comes before the reduplication, as during and, but theπιμπλάμην.)

 πίμπρημι, I burn (trans.), quite like πίμπλημι; πρήσω, ξπρησα, πέπρηκα, πέπρησμαι, ἐπρήσθην, πεπρήσομαι.

7. TAHMI, I bear (the present and the imperfect are wanting, for which are used browlers, ἀνέχομαι), ποτ. έτλην, τλώ, τλαίην, τλήθι, τλήναι, τλάς; fut, τλήσομαι; perf. τέτληκα; verb. adj. τλητός. In Attic prose this verb is rarely found. - -

8. φη-μί, I say (ΦΑ-), is formed thus:-- · ·

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Active. PRESENT.

INTERFECT. Ind. Sing. 1. onul. Ind. Sing. 1. fonr. 2. ons. 2. Concea er Cons. 3. φησί(v). 3. fon. Dual. 2. φάτόν. Dual.2. foarer. 3. φάτ*ό*ν. 3 épárne. Plur. 1. paule. Plur 1. Epauer.

2. daté. 2. Eφάτε. 3. φασί(ν). Β. ἔφάσαν. Subj. φω. φης, φη, φητον, Opt. φαίην, φαίης, φαίη, φώμεν, φήτε, φώ-

φαίητον and φαῖτον. σε(v). φαιήτην and φαίτην. Imp. φάθι, φάτω, φάτον, palnuer and painer. φάτων, φάτε, φάdainte and daire. τωσαν and φάντων. daier.

Inf. φάναι. Fut, offew. Part. (pás, para, pár; Aor. epnra. G. pártos, párns. etc., not Attio.)

Passire.

Perf. Imp. πεφάσθω, let it Verb. Adj. φατός, φατέος. be said.

In compounds we have arrionus, I speak against, and σύμφημι, I speak with, agree. φημί has a double meaning-first, to say, in general, and then to say yes, to affirm (in Lat. aio, I say ay).

Here belong the following deponents :-

1. Kyanas, I admire; imperf. hydune, nor, hydasne, fut, ayaσομαι.

. . 2. δύναμαι, I am able, I can : subj. δύνωμαι ; imper. δύνασο; inf. δύνασθαι; part. δυνάμενος; imperf. έδυνάμην and ήδυνάμην, έδύνω, etc.; opt. δυναίμην, δύναιο; fut. δυνήσομαι; nor. έδυνήθην, ήδυνήθην, and έδυνάσθην: perf. δεδύνημαι: verbal adj. Suvarés, being able and possible.

3. Inforana, Iknow, I understand, inforana, etc.; subj. ἐπίστωμαι; imper. ἐπίστω, etc.; imperf. Informe, etc.; fut. emornoque; nor. inστήθην ; verbal adj. ἐπιστητός.

4. Ipaum, I lore (in the pres, and imperf. do(d) is used in prose) 1- aor. hodobny (Lat. amari), I lored; fut. ¿pasthoonas (amabo), I shall lore.

5. spinana, I hang, depend (Lat. nendee); subj. креньши, imperf. гкренации, opt. кренации. -am, -arre: nor. έκρεμάσθην: fut, perf. κρεμας-Chronus, I shall be hanged ; fut, mid, socicount, I shall hang (Lat, pendebo).

6. πρίασθαι, to buy, επριάμην, 2 pers. επρίω, n.

defective acrist middle employed by the Atties instead of the agrist of ωνέσμαι, namely, dwengdune, which they did not use; subj. - πρίωμαι; opt. πριαίμην, -αιο, -αιτο; imperat. molo: part. moiduevos.

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VERBS IN ε-, AS τι-θη-μι (ΘΕ-).	Present.
	INDICATIVE. SUBJUNCTIVE.
"I-n-m (H. instead of E-), I send. Many forms of	Sing. 1. elm. Sing. 1. tw.
this verb occur only in compounds.	2. cl. 2. far.
Active.	3. elas(v). 3. in.
Pres. Ind. "inju, "ins, Ingi(v), Terov, Tenev, Tere, Tage(v).	Dual, 2, Trov. Dual, 2, Invov.
Subj. Ιω, της, τη, Τητον, τωμεν, τητε, τωσι; αφιώ,	3. Trov. 3. Tyrov.
àφιῆs, etc.	Plur. 1. fuer. Plur. 1. fauer.
Imp. τει, ίζτω, etc.; inf. lέναι; part. leis, iεισα,	2. fre. 2. fnre.
160	 Τάσι(ν). Τάσι(ν).
Impl. Ind. Test (from 'IEO). Test, Tes, Teror, Terny,	
Τεμεν, Τετε, Τεσαν (also την in ηφίην).	Imperfect.
Opt, leine.	INDICATIVE, OPTATIVE
2 Perf. Act. elka, apeika; pluperf. elkn; fut. how; 1	Sing. 1. herr or ha (xappa), Sing. 1. torus or lolys.
aor. ἡκα, ἀφῆκα ; the indicative singular	I went. 2. loss. 2. loss or hesala. 3. los.
is supplied by the first norist; D. elver	
(apeiror), eirnr ; plur. einer (nabeiner),	3. per. Dual. 2. forror.
elre (aveire), elrav (apeirav); subj. &	Dual. 2. perrov or frav. 8. lolryv.
(àφῶ), hr (àφῶr), etc.; opt. είην, εἴης, εἴη;	3. jelrav " prav. Plur. 1. loquev.
eiror (àpeiror), eirny; einer (àpeiner),	Plur. 1. petuer " puer. 2. forre.
elre (apeire), elev (apeier); imperat.	2. perre " fre. 3. foew.
ės, apes, eru; erov (aperor), eruv; ere	, 8. herav " frav.
(apere), Frugar and Frrur; inf. elvas,	, IMPERATIVE.
apeira; part. eis, eloa, er; G. erros,	Sing. 2. 1θι, πρόσιθι. Ιπρ. 1έναι
elon, ; àpels, àpelou, àpér, àpérros; etc.	3. Irw. Part. iw, loson ldr
The augment of apinus follows the	Dual. 2. Year, πρόσιτον G. lórros, lobans
analogy of those verbs in which the	 Ττων (παριών, περι-
two compounds have coalesced so as	Plur. 2. Υτε, πρόσιτε. · · οῦσα, παριόν, G
to produce one idea.	3. Ιτωσαν οτ Ιοντων. παριόντος).
•	Verb. Adj. Irds, Irles.
Middle.	VOCABULARY.
Pres. Ind. Tenas, Teras, Teras, etc.; subj. Tonas, apro-	Azeini, I am away from, Ezeira, afterwards, in
μαι, ifi, ἀφιfi, ctc.	I am distant. the second place,
Imp. leσo or lov; inf. leσθαι; part. leμενος, -η, -ον.	Απειμι, I go from, I go Ερυμάνθιος, -α, -ον, Ετγ-
Imperf. Ιέμην, Γεσο, cto.; opt. Ισίμην (Ιείμην), Ισΐο, άφισῖο.	away. manthine.
2 Aor. Ind. ejunv; eloo, apeloo; elro, apelro; subj.	'Aρκέσμαι (in nor. pass., 'Εφίημι, I send to, I send
δμαι, άφθμαι, ή, άφη, ήται, άφηται;	with dat.), I satisfy for; mid. (with gen.)
opt. προσίμην, -οῖο, -οῖτο, -οίμεθα, etc.;	myself. I desire.
imper. οδ (ἀφοῦ, προοῦ), ἔσθω, etc.;	'Αφίημι, I send forth, Καθίημι, I let down.
2 plur. έσθε (ἀφέσθε, προέσθε); είμεθα,	nllow to go, set free, Kaprepos, d, dv, strong coase, omit, give up. powerful.
etc.; inf. ἔσθαι; part. ἔμενος, -η, -ον.	
Perf. είμαι, μεθείμαι; inf. είσθαι, μεθείσθαι;	Δέον (from δεί), τό, what Κραυγή, ιῆς, ἡ, a cry. is due, duty. Λίθος, -ου, ὁ, a stone.
plup. elimp, eloo, apeiso, ctc.; fut.	
ήσομαι; 1 aor. ήκάμην only in the indicative, and rarely.	Δήθεν, namely (in Lat. Μεδίημι, I send after, l soillest, seire licet), that loose.
Passira.	is to say. Neilos, -ou, o, the Nile.
	Διογένης, -ous, ή, Dio Παρασκευάζω, I prepare
 Aor. είθην, ἐθῶ, ἐθῆναι, ctc.; fut. ἐθήσομαι; 	genes wid. I prepare myself
verbal adj. ėrėss, aperės.	Elσειμι, I go in, I come in. Παρίημι, I send by.
	'Εμβροχίζω, I drive into Πέδη, -ης, ή, a fetter
Elµl (stem EZ-), I am, and elµl (stem 1-), I go.	a snare, a net (βρύχος, (πούς, a foot).
	a snare). Ilλεονάκιε, often.
The conjugation of eiui, I am, has been given	Elfan, I send out; (of a Indoesna, I go to, I ap
already when we began our consideration of the	river) to pour forth, proach.
verb. We subjoin that of elm, I will go.	fall into.
	·

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efforts, unless in the excent case from treats cruses were present constructing the effect of the first. Even in this case, all the causes produce their cases in the case of the case and case in a
one case to the next, still test to the whole does all two-day languardly admitted that the industries of release night be reduced to the defection of release which the reduced to the defection of the reduced to the reduced that the reduced to the reduced to the reduced that reduced to the reduced reduced reduced remember to reduced reduced reduced remember to reduce the reduced reduced remember to reduce the reduced reduced reduced remember to reduce the reduced reduce

clamateditation, by fisheritance.

Some philosophiers, manog them Kant, have held that this "Law of Cassmition," or "Law of the Uniformity of Naturn," is not negative by experient the property of the Uniformity of Naturn," is not negative by experient and, and that were we not also interest of the Universe. Kant, indeed, held that it was identical with the principle width he properted as in beats of the Dypothetical splington. To discuss this of the Dypothetical splington. To discuss this is considered to the control of the Dypothetical splington.

is desirable in an elementary work.

Mill's. "four methods of inductive inquiry " are based on the following ennous, which a little reflection will show to be special forms of the Law of Onusantion. We may abridge them thus:—

1. Agreement. Whatever in the various cases

 Agroement. Winterver in the various cases oxamined is nivery found correlated with the result in question, is seen part of, or samphore connected to the existence or plausality of causes; offects may be to all appearances similar, and yet may be produced by different equiese. Hence the inspiry law to be presented further by the aid of the method.
 Miference. Winterver by its aid of the method.
 Difference. Winterver by its aiddition makes.

a difference to the result in question is some part of the cause of that difference. Concomitant Variations. An antecedent and a consequent varying together, directly or inversely, are connected through causation.

 Residues. When it is known that part of a phenomenon is due to certain antocedents, the remainder is the effect of the remaining antecedents [observed].

These are rather methods of proof thum of setentific discovery property speaking. Discovery simulty proceeds by the "deductive method," that is to my, by forming an hypothesis or supposition as to the cause of a given phenomenon, then by seeing to what conclusion the hypothesis will said, and then what conclusion the hypothesis will said, and then facts. The olide principles by which the observer facts. The olide principles by which the observer is guided in testing his pypothesis may, however,

be stated in the form of the above canona. Remaple only differ from induction in hurring a singular instead of a general conclusion, and in bottom formation and any state of the configuration of the singular state of the configuration of the singular state of the configuration of the singular state of the s

PALLACIES.

A falleny is defined by Archibideap Wheeley in "any massend mode of arguing, which supports to rhomest for correlation of the property of the arguing and the correlation of the property of part of Legie which deals with the classification, and desceibes of the different kinds of Tallindes it and desceibes of the different kinds of Tallindes it in the contract of the contract of the contract of the contract and the contract of the contract of a second to the contract tracks, as because it orthibits in the contract of the contract tracks, as the contract of Legie in teceding mon to greated appliest some of the mistakes in reasoning into which they alight the contract of the contr

Now it was upon reactions report pions not collected ret over year—tie, dither I the manner in which the conclusion is mode to result been to which the conclusion. It mode to result been con called to the pressions are themselves hald down or bissanced. We may obbse reasons verongly which we have been considered to the control of the

Verbs whose Stem ends in a.

 κερά-ννῦ-μι, Ι πία; fut. κεσάσω, Attic κερῦ; αιτ. ἐκέρᾶσα; potl. κέκρᾶκα; mìd. I mia for πιγεεξή, αιτ. ἐκερασάμην; porf. mid. or pass. κέκρᾶμα; αιτ. pass. ἐκράθη (by metathesis), αlsο ἀκεσάσῶν.

 κρίμα-ντύ-μ., I hang; fut. κρεμάσω, Attic κρεμώτ aor. ἐκρέμασι mid. or pass. κρεμάννιμα, I hang myself or am hanged, but κρέμμαμι, I hang; fut. pass. κρεμασθήσομα; nor. ἐκρεμα σθην, I seas hanged or I hang (intrass).

 πετά-νεῦ-μι, I spread out, I open; int. πετάσω, Attic πετῶ; porf. mid. or pass. πέπτἄμαι (by syncope), aor. pass. ἐπετάσθην.

Vorbs whose Stem ends in e.

ζέννο-μι, I boil (transitive), fut. ζέσω; nor. ξέσα; porf. mkd. or pass. ζέσμα; nor. pass. ζέσθην (ζέω is commonly intransitive).

3. ophywo-u., Lextinguish, Int. ophwa: nor kapken; 2 nor. kapny, I rent ent, I reas extinguished; perf. kapne. I have been put ent; mid. obsewum, I po ent; perf. mid. or pass. kapkenus; nor. pass. kapkenu. There is no other verb in -reput. except this, with a second norist.

 -rνθμι except this, with a second agrist.
 στορέ-ννθ-μι, I spread over, fut. στορέσω, Attic στυρῶ; not. ἐστόρεσα.

Vorbs whose Siem ends in o, lengthened into ω.

1. ζά-ννί-μι, I gird, Int. ζάσω; nor. ἔζωσα; mid.

I gird myself, nor. ἐζωσάμην; perf. mid. ör
pass ἔζωσμα.

 βώ·ννυ-μι, I strengthen; Int. βώσω; nor. ἔβρωσα; porf. mid. or pass. ἔβρωμα (ἄβρωσο, vnle. farenell); inf. ἔβρώσθαι; nor. pass. ἔβρώσθαν.
 στρώ-ννὺ-μι, I spread ont; Int. στρώσω; nor.

έστρωσα, etc. (See στορέινυμι.)
4. χρώ-ννῦ-μι, I colour; fut. χρώσω; aor. έχρωσα; perf. mid. or pass. κέχρωσμα; imp. έχρωσθην.

perf. mid. or pass, κέχρωσμαι; imp. έχρωσθην.
(2) Verbs whose stem ends in a consonant and

takes vo are the following —

1. äy-vi-u, I break; Int. äfu; nor. fafu; inf. āfu;

2 perf. šāya, I haro been broken; nor. pass.
dāyns.

 εἰργυνμι (or εἰργω), I restrain, enclose; fut. εἰρξω; nor. εἰρξα; aor. pass. εἰρχθην; perf. mid. or pass. εἰργμαι.

ζεύγ-νῦ-μι, I yoke, bind; fut. ζεὑξω; nor. ἔζευξα;
 mid. I bind for myself; nor. ἔζευξάμην; port.

mid. or pass. έζευγμαι; αοτ. pass. έζεύχθην, and more commonly έζύγην.

 μέγ-νῦ-μ. Ι πίτο; fut. μξῶ; αοτ. ἔμιξα, μῖξα; perf. μέμιχα; perf. mid. or pass. μέμιγμα; αοτ. pass. μέχθην, ἐμίγην; fut. pass. μιχθήσομαι, μιγήσορια; 3 fut. μεμξομαί.

μα, μεγήσομα; 3 του, μεμιόμα.

δήγγετω, Ι break, Ι tear; fut. δήξω; nor.
δήδηξα; 2 perf. έροωγα, Ι απι broken; nor.
mid. έροηξάμη»; nor. pass. έρομγη»; fut. pass.
δάγγασμα:

INFLECTIONS OF THE TWO PRESENT PERFECT FORMS, SEGUAL, I He, AND Suga, I sit,

Perl. Ind. κείμαι, κείσαι, κείται, κείμεθα, κείσθε, κείσται; subj. 3 sing. κέηται; opt. κεομιγν, κέοιο, κέοιτο, cto.; imperat. κείσο, κείσθω, etc.; inf. κείσθαι; part. κεμένοι.

Plup. Ind. ἐκείμην; ἔκεισο, ἔκειτο, 3 plur. ἔκειντο.
Εμέ. κείσουσι.

гис. кызорас.

*Huat, I sit, is thus conjugated:—
Perf. Ind. ήμαι, ήσαι, ήσται, ήσθον; ήμεθα, ήσθε, ήνται;
imperat. ήσο, ήσθω, etc.; inf. ήσθα;

part. Hμενος. Plup. ήμην, ήσο, ήτο ; ήσθον, ήσθην ; ήμεθα, ήσθε, ήντο.

(As the perfect form has a present meaning, so in both verbs the pluperfect is equivalent to the imperfect.)

Perfect. κάθημαι, κάθησαι, κάθηται; snbj. καθώμαι, καθή. καθήται, etc.; opt. καθοίμην, κάθοιο, κάθοιτο; imperat. κάθησο; inf. καθήσθαι; part. καθήμενος.

Pluperf. ἐκαθήμην απά καθήμην, ἐκάθησο απά καθήσο, ἐκάθητο απά καθήστο.

VERBS IN - WHICH IN THE SECOND AORIST ACTIVE AND MIDDLE FOLLOW THE ANALOGY OF THE VERBS IN - µ.

Several vorbe having the characteristics a_i, a_i, a_i form a second norist active and middle after the analogy of the formations in $-\mu_i$, singe those tenses want the mood-towel, and append the person-endings immediately to the stem. All other parts of these verbs, however, follow the formations in $-a_i$; thus—

βαίνω (BAΩ), I step, has 2 aor. indic. έβην, imperat.
βῆθι, subj. βῶ, opt. βαίην, infin. βῆναι; part.

σβέννυμ (SBEA), I put out, 2 nor. ἔσβην, imperat.
σβήνι, subj. σβώ, opt. σβείην, inf. σβήναι, part.
σβείς.

γιγνώσκω (ΓΝΟΩ), I learn, 2 nor. έγνων, imporat. γνώθι, subj. γνώ, opt. γνοίην, inf. γνώναι, part. γνούς.

δώ». I coror, 2 aor. έδυν, imperat. δύθι, inf. δύναι,

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pur. $\delta \dot{\nu}_{5}$ (opt. and subj. follow the formation of verbs in $-\omega$).

In ordinary style the second agrist middle is found in very few verbs; as πέτομαι, I fly; πρίαμαι, I purchase.

VERBS WHICH FOLLOW THE FORMATION OF VERBS IN - µ1.

Besides those already mentioned, there are several other verbs which form their tenses according to the analogy of the verbs in -µ. Such are:—

- διδράσκω, I ran anay from ; aor. (ΔΡΑ-) ἀπόδρω,
 ἀι, ἀ, ἀμεν, ἀπε, ἀσω ; subj. ἀποδρώ, δρά,
 δρά, δρώμεν, δρώσι(ν); opt. δράην;
 imp. ἀπόδραθι, ἀπω; inf. ἀποδρώνω; part. δράς,
 ᾶσα. ἀι.
- πέτομαι, I fly; nor. (ΠΤΑ-) ἔπτην; imp. πτῆναι; pass. πτds, not. mid. ἐπτάμην, imp. πτάσθαι (by syncope).
- σκέλλω οι σκελέω, I dry, I dry up (hence our skeleten); nor. (ΣΚΛΑ-) έσκλην, I am dried
- inf. σκλήναι; opt. σκλαίην.
 φθά-νω (with acc.), I get before, I anticipate;
- ποτ. έφθην, φθώ, φθαίην, φθήναι, φθάς. 5. καίω, Ι burn (transit.); ποτ. (ΚΑΕ-) ἐκάην, Ι
- burnt (intrans.), but 1 nor. έκανσα (transit.),
 I set on firê.
 άλίσκομαι, I am taken, caught; nor. ('ΑΛΟ-)

They and taker.

- Bιόω, I live; aor. εβίων; subj. βιῶ, -ῶs, -ῷ, eto.; opt. Βιώμν (not Βιοίην, na γνοίην; to distinguish this part from the opt. imperf. βιοίην); inf. βιῶω: i; part. βιούς, -οῶνα (the neuter does not occur); the cases, however, are supplied by
 - occur); the cases, however, are supplied by the 1 oor, flucture (cs.) surfluor, T three agartis, from devalledorasu). The present and imperfect are little used by the Attas, indicaid of which they employ Go (Ldo.) which, on the other hand, borrows the remaining tensor, from Bulos has—Pres. (cs. imperf. £Go., fatt. Bulosqua, nor: £Blus.perf. £g. flucture, £g. flucture, but a Blus.perf.
- φύω, I bring forth; 2 nor. ξφῦν, I arosc, cameinto being; φῶναι; φύs, subj. φόω (no opt. in Attio), 1 nor. ξφόσα, I brought forth; fut. φύσω, I shall bring forth. The perfect

πέφῦκα. I have come into being, I have become, is also intransitive. The mid. pres. φύομαι, fut. φύσομαι.

fut. φύσομαι.

Particular attention must be paid to a verb of frequent occurrence, namely, előg (stem ΕΙΔ-:

PERVECT.

rid-ee in Latin), I know.

Ind. S.	1. olba Subj.	€iôŵ.	Imperat.	Infinit.
•	 οἶσθα. 	eiòfis.	Τσθι.	eibérai.
	3. οίδε(ν).	eibii.	ζοτω.	
D.	2. Torav.	eibirov.	ζατον,	Participle.
	3. їстор.	εἰδήτον.	Yorwe.	ειδώς, -ν la, -ός.
P.	1. ίσμεν.	είδωμεν.		, ,
	9 Years	ei89re	Yerre.	

3. Ισάσι(ν). είδῶσι, Ιστωσαν.

Sing. Dual. Plut. Opt. $\epsilon i\delta \epsilon i\eta \nu$, $-\eta \tau$, $\epsilon i\delta \epsilon i\eta \tau \sigma \nu$, $-\eta \tau \eta \nu$. $\epsilon i\delta \epsilon i\eta \mu \nu \nu$, $-\eta \tau \epsilon$, $\epsilon i\delta \epsilon i \nu$.

PLUPERFECT.

Sing.	Dual.	Plnr.
 Ind, 1. βδειν (Attic βδη) \	ήδειτον. ήδείτην.	ήδειμεν. ήδειτε. ήδεσαν.

FUTURE.

(Of olda there is this compound—σύνοιδα, I am conscious, inf. συνειδέναι, imp. σύνισθι, subj. συνειδώ, etc.)

INVARIABLE WORDS

The words which we have hitherto studied are susceptible of certain changes. We may next consider words which do not undergo change, or underso change only to a small extent. Many of these have occurred in the course of these lessons, but it will be found useful to group some of them together.

PREPOSITIONS.

The prepositions require careful study, as on them, as well as on other invariable verbs, the sense very much depends; and we shall miss some of the most delicate shades of meaning if we do not familiatise our minds with the particular import and usage of the prepositions and the conjunctions.

Prepositions have a relation to place, and denote the direction of an action in regard to place. Then, we say, "You go from home," "you go for home," "you go for home," "you go for home," "you go for home," "lyou go for home," "lyou go for home," "lyou go for home," "lyou go for the wal." "In order, therefore, to possess an exact knowledge of the prepositions, of which there are in Greek eighteen, we must study them in their relation to place. 1"

The Prepositions arranged in their Relations to Place

RITATIONS TO PLACE.	GREEK.	ENGLISH.
 Place where you are. 	1. ₹ν,	in.
2. Place whither you go	 2. εἰς στ èς, 3. πρός, 	into.
3. Place whene you	4. 2km 2.	out of.
come,	5. å#6,	from.
 Place through which 		through.
you pass.	ī. ara,	up.
5. Place at which you stop. Pince down which you go.	-S. ката́,	down, at
6. Different relations of	position:—	
Place by the skie of	/ D. παρά,	along.
,, together with	10. μετά,	with.
, connected with.	11. who and E	ór, with.
" over	12. ὑπέρ,	over, above
, under	13. úπó.	under, by.
, before	14. mpó.	before.
" on both sides " around	15. αμφί, 16. περί,	around.
	17. čnl.	on.
7. Opposition, dis-		against.

The following words may also be considered as prepositions, namely, area, aven, without : Frena, on account of : axon mixon up to, until; whip, but, except : perato, between ; but they differ from the above in that they cannot be compounded with

Propositions are very frequently used in combination with verbs Such verbs are then said to be compounded with prepositions. Thus, by the addition of the proposition eis, into, to the simple verb arw. I lead, we get the compound yorb sladyw. I lead into. More than one preposition may combine with a verb. for example-

¿Eávo. I load out (an army from its camp). παρεξάγω. I lead out (an army against the enemy). arrivacelaw. I lead out (an army, and march it to assail the enemy).

ADVERDS.

Among the invariable or indeclinable words are adverbs. Adverbs qualify action in regard to-(1) Place. (5) Interrogation.

- (2) Time. (6) Aftirmation. (3) Manner or quality. (7) Negation.
- (4) Quantity. (8) Doubt. .
 - (1) Adverbs of Place.

One kind of julycrbs of place is derived from

, the prepositions. The following will examples :---

Erdor, within. EFFOS. -ĭσω. within (with motion). 3, πρός, forwards, in advance. outwards, externally. · 4. ¿Ł.

These adverbs are often found before a genitive. and so perform the part of prepositions; for example, πόρρω της πόλεως, far from the vity; είσω TOV vacance, within the entrenchments. The following also may have a genitive, and

others, which will be learned by practice, as :-Tike, for off; wise and wiser, on the other side of (a river); xwpis, separately; mixas, iyyis, ayxi,

There is another kind of adverbs which, by means of certain terminations, express the different relations of place :-PLACE WHERE YOU ARE. PLACE WHITHER YOU GO. που. πόθι. πhere .* ποῖ, πόσε, whither .' tuei, tueile, there. incipe, thither. oinos, oinots, at home. olkovše, home. Achron, at Athens. àλλόσε, somewhere else.

'AchvaCe, to Athens. PLACE WHENCE YOU COME. PLACE THROUGH WRICH YOU nover, whence, PARS incider, thence. πb. by what way olnober, from home. exelen, by that way.

άλλοθεν, from some other place. - aλλη, by some other way. Abhraber, from Athens

From this view you see that the terminations or particles--ου, -θι, -οι, -σι. denoto the place where you are.

-8e, -ve, -(e, and] whither you go. sometimes -o. J -Oev то*ћенсе уок* соше through which

non pars. -Ov is the termination of the genitive. Thus, well represents in mod rémon: in what place? -Or is the old form of the dative, so that ofcor is

'Achraos is for Achrais, the dative of 'Achras. This ending applies particularly to the names of cities. -Organizate to be an ancient form of the genitive.

The poets say giver for gov. of thee : thus, oinder is equivalent to de ofreu. -Hs is the termination of the dative, 58 being

understood : thus, and is for in and sou, bu another wan.

(2) Adverbs of Time.

The principal adverbs of time are the following:-

σήμερο, to-day (from how, by this time, free, a day).

σμον, to-morrow.

χθές, resterday.

σύτκά, immediately.

προθές, the day before τότε, then.
yesterday.
του, in the morning.
θάμα, often.

but, in the evening.

cur, rues, now.

πd.au, of old, formerly.

σων, μου νει.

πμε πρις μενίουσελγ, before.

cira, next, then.

. (3) .ldrcrbs of Quality.

Adverbs of quality end in -ωs, and correspond to our adverbs in -ly: —σοφως, πisely; πεπαιδευμένως, learnedly; εὐδαιμόνως, fortunately.

To this class may be referred obres (before a consonant, obres), thus, in this way, from ebros; incluss, in that way, from ekeives, that person; and in general all the adverbs ending in ess.

Others have the form of the genitive or dative of the first declension:—

tins (from obsolete nominatives), forthwith.

πσυχή (from πσυχοι), peacefully.

Usage has suppressed the iota subscript as found in ήσύχη δδα. Other adverbs of quality have the terminations -ε₁, -τ₁, -στ₄, and consequently resemble

clatives of the third declension :--

άμαχητί, without combat.

1λληνιστί, in the Greek language of manner.

Some have the form of accusatives:—

μάτην (nominative obsolete), in vain. δωρίαν , , , gratuitously.

Those of this division in -800 and -800 correspond with the Latin adverbs in -tim :— .

αγεληδόν (gregatim), by flocks. κρυβδήν (furtim), secretly.

(4) Quantity.

The adverbs of quantity are susceptible of the same terminations as those of manner. Here are some of them:—Ayar, soo much; Mar, extremely; they, abundantly; this, sufficiently.

Those which particularly mark number end in

noσάκις (from πόσος, how many?), how often?
how many times?
πολλάκις (from πολύς, numerous), many times.

πολλακίς (from πέλτσης, four), four times.
πεντάκις (from πέντε, fire), five times.

The rest of the adverbs formed from the cardinal numbers follow this analogy, except &σat, once (semel); δis, twice (bis); τρis, three times (ter).

(5) Interrogation.

A usks a question simply: Do you say this? A λέγεις τοῦτο;

āρa asks a question mostly with an expressive then, really:—Do you, then, say this? δρα λέγεις

μῶν (μη οδο) expects a negation num: μῶν λέγεις τοῦτο, you do not say this, do you. It is also used in simple interrogations.

(6) Affirmation

η, η μήν, yes, certainly, in truth.

δρα, ρά, τοί, δή (in the poets), then, certainly, assuredly.

μέν denotes a contrast, and strengthens, = indeed (quidem).

γε asserts something in addition, and gives

emplusis to its word, = at least.

ral (Latin na. English nan), nes. truly.

(T) Negation.

οὐ (οὐκ before a rowel), { no, with direct negations no means. } and indicative mood.

μή, οῦ μή, μη οὺχί μηδαμῶς that not, with indirect negations and imperative mood.

(8) Doubt.

lows, τάχα, που (without accent), perhaps, pro-

bably.
δήπου, δήθει, apparently.

There are some words which, without being adverbs, are employed adverbially. We have sendaverbs which have the form of the genitives, datives, and necessarities. We are now to see those cases themselves perform the office of adverbs. Their cases are said to be owing to certain prepositions which have been drouped in conversation:—

Gen. rværðs (διά), by night, at night. Dat. βla (σὐν), by force, forcibly.

κύκλφ (tr), in a direular, circularly.

Acc. δίκην (κατά), in the form or manner of.

χάρυ (πρός), in farour of.

ποσικά (κατά), gratuitously

Sometimes the proposition is expressed and united to the noun: as \longrightarrow

παράχρημα (παρά, at ; χρημα, the thing), at the . moment.

προύργου (πρό, for; έργον, the deed), usefully, beforehand.

innober (in, from; note, the foot), at a distance, far from.

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ré. self, I avenge myself erépares. Fut. exedd-ee. корі-ғи. отра mouth mouth of a on. Attio execu, -er, -e. Attio zeen, -eir, -el Aor. è-exésa-en. δ-κόρα-σα. Е-стры-ан Tought, I help; mid. known.
(with acc.), I help my- Xide, xidees, \$, anow. Middle Ргсы, окева-орб-нан, корб-гоб-раз. стро-ооб-раз. Expicise 125. Ιαιρ. έ-σκεδα-σνό-μησ. έ-κερε-νού-μην. έ-στρω-νού-μην Translate into English :-Perf. I-vulla-v-рии. пе-поре-v-рии. Г-отри-рии. 1. Of ayabel ob bed row baron medican the blown Plup. в окоба о разу. в же корв о разу. в отре разу. redries. 2. Mh bloce to bourd deals to corred. коре-еория, 3. Παλλοί πεθρωποι έφίσεται πλεότου. 4. IIdas Aor. i-more-minus Advances els ton Exaferentes national Espere, repa-BFut. ne-nood-count polymerar differ the Endformerton. 5. Out de xemple Passire.

μεθέστα καρτερδο λίθου βῆου κατκεχεῖε, οὐτ' ἀπὸ γλών-της λόγου. Β. Ήρακλῆε τὸν Έρυμαιθιου κάπρου διάξιε μετὰ πρωγής είς χιόνα πελλὰν παρείμενον ένεβρόχισεν. 7. 'Ο Νείλος έξέησεν είς τὰν δάλατταν ἐυτὰ στόμασεν. 8. 'Αττκ έπειτ' έσται, ταῦτκ θεοῖς μέλει. 9. Εἰ θυητὸπ el. Biarrere, Sperè nal codper. 10. Minpero pies de. de plone dep verd. 11, Aireier feet, fra unt dienter roxps. 12. Blas superiors, oilly lexies rigos. 13. Eidalume eine und Beole dines.

EXERCISE 126. Translate into Greek'-1. Be thou. 2. Let him go. 3. Let mo be. 4. I wish I were. 5. Desiring. 6. Going. 7. Let them be. 8. Let them go. 9. Do you go. 10. Be thou 'good.' 11. Be ye good. 12. Let them be good. 13. I send out. 14. You let down. 15. They approached. I will go. 17. They will go. 18. Thou wentest.
 They two went. 20. The good man will navor omit to do his duty.
 Many desire tho inknown, giving up the known. 22. Xerxes let fetters down into the Hellespont. 23. Not by the tongue but by deeds may a man become my friend. 24. Be ye just, that ye may obtain justice. 25. A friend-cares for his friend even when absent. 26. When the enemies came into the city, the estizens fled. 27. Begone, O beys, 28. The soldiers must leave the city. 29. Two armies camo into one - native land

VERRE IN - WHICH, APPER ADDING THE SYL-LABLE PRO OR PO TO THE STEM-VOWEL, APPEND THE PERSONAL ENDINGS We give here the formation of the verbs in a, e, e, and of those whose stem terminates in a

consonant:-. (a) Verbs with a Stem ending in a, ϵ , ϵ (ω). . _letive.

Ргев. вкеда то да, Г корф-то-да, Г втра-то-да, І scatter. . satisfy. spread out, Imp. f-suedai-ved-v. I-sopi-ved-v. δ-στρώ-ννδ-ν. Perf. & onica na. ке-мере-ип. . 1-отры-ип. Plup, i-onetá-en. i-me-nori-un. i-strai-un.

Acc. &-credd-c-byr. &-xepi-c-byr. 1-crps-byr. Рис. океди-о-берован коре-о-берован, отры-берован. Verbal Adj. suedasvés, suedasvés; uspesvés, REDECTÉOS : CTOUTÉS, CTEMPÉSE.

Another form of the present and imperfect is, excension, t-exced-rever; repression, t-rapt-rever; erpe-rous, 2-erps-rouse; the o being always short. (b) Verbs with a Stem terminating in a Consonant, ан БА-Ан-µи (ОЛ-), I destroy, and \$µ-10-µи (ОМ-),

Mul. and Post. Pres. 53-A6-per (Lat. per- 5u-p6-pe. 5u-p6-per. do). űλ-λβ-μαι (perco). 4λ-λά-r. Gurber. darringer.

1 Perf. èl-dite-su (OAEA), èp-suo-su èp-suo-o-pas-perdidi. (OMOA). perdidi. 3 Perf. 5λ-ωλ-a, perii. 1 Plup. &A-uAd-un, perdid- èp-upd-ne àp uno-o-priv.

craw. 2 Plup. 84-64-up, peries Fut. 63-6, -18.

έλ-ιδμαι, -<u>β</u> 1 Aor. Shees. 2 Acr. &A-éper. -σα. - ομο-σήμην. 1 Α. Ρ. ομό-σ-σην.

1 F. P. èpe-e-thropas Of the present and imperfect there is another form with the w short, namely, \$220-0, \$220-00; àμεύ-ω, äμευ-er. The present, the first perfect, and the first plaperfect have a transitive signification—thus,

pres. I destroy. 1 perf. I have destroyed, 1 plup. I had destroyed; and the 3 perf. and 2 plup. have an intransitive meaning, as 2 perf. I have perished (I am lost, it is all over with me), 2 plan I perieked. The middle of SAAuga (namely, SAAugan) signifies I am perishing. (1) In particular instances belonging to this . class of verbs the stem ends in a vowel, and takes

The large majority of fish are completely invested by plates and scales. With few exceptions even the lips are hard and dry, so that they need to have some special organs of touch. Sometimes certain rays of the fins are detached from the var-like parts, and become long styliform organs of touch. When this is the case, they are clothed with soft parts, which are well supplied with nerves. Thus, in the curnet three soft rays are told off from the front of the pectoral fin, to form feeling fingers. It is curious that in a creature so far removed from man we have the same parts modified to the same use, though in almost all the intermediate animals this part has a different function. In the angler two rays detached from the back fin, and situated on the top of the head, have this function, but the use to which he puts these feelers is remarkable. One of the feelers has at its end a flattened, shining, and flexible adjunct, and this is used as a bait, just as a silver strip is used by the troller. The angler is rapacious, but sluggish; he therefore lies on the bottom, with his hugo ugly mouth wide open, and stirs up the mud with his fins to conceal himself, while he drops his sensitive bait before his month and keeps twitching it about, until he feels some hapless fish begin to nibble, when he makes a forward rush and closes his mouth upon him. The whole of each of the four limbs of the lepidosiren are converted into organs of touch. For the most part, however, the limbs of fish which correspond to our legs and arms are entirely devoted to locomotion, while quite new structures are developed for them to feel with. These special tactile organs are called barbules. They are placed on the head, and generally at the fore part of the jaws. When on or under the lower jaw they may he single; but they are more often, and when on the upper jaw ulways, in pairs. Two instances are given in the illustration (lesson X.): the one shows how they occur in an eel-like fish, and the other in an ordinary-limbed fish. The single medial barbule under the jaw of the cod is a familiar example. It is supposed that a cod which was blind when caught had obtained its food so well by the aid of this that it was quite in good condition. Barbules are well adapted to the purpose of touch. If in any other way nerves were conveyed through the sealy covering and exposed, these delicate structures would be liable to he injured by the impact of hard external hodies, which would be crushed between them and the hard and underlying scales: but since the main nerve of these harbules accompanies a eartilaginous core, and since it springs from a single point to be spread upon a flexible pillar which hard hodies would drive before them, the chance of having the nerve crushed is much !

reduced. Barbules are for the most part found on the jaws of grovelling fishes like surgeons and barbels, which feel along the bottom for all kinds of garbage which may have sunk there.

The mollusca have received their name from their general character of softness; woll is being the Latin adjective for soft. This name was given them by Cuvier to contrast them with the hardcoated insects and crustacea, which belong to the sub-kingdom articulata or arthropoda. Hence in those species which are not provided with a shell. and in the exposed parts of those species which have this protection, there is a soft, sensitive skin. The skin, however, in this sub-kingdom has often superadded to the functions which it possesses in vertebrata the functions of respiration and of locomotion. Even those parts where the sense is more or less localised have so many other offices to which the sense is secondary or subscryient, that it would lead us too far from our subject to describe them. It is true that the gastropoda have horns as special tactile organs; but we find in the cephalopods the sense of touch is intimately combined in the arms with the elaborate apparatus for grasping and holding their prev; and in the brachiopods the sense is united with the organs for breathing and keeping up currents in the water. We must therefore avoid going into details in reference to them. It may be stated generally that the slower an animal moves, and the more fixed its station, the more will its sense of touch he developed in proportion to the other senses. Hence the sense of touch is well developed throughout this sub-kingdom. Soft bodies are ill snited to energetic motion; but soft bodies are well adapted to receive tactile impressions. In those animals of . this sub-kingdom which are wholly fixed the organs of touch are multiplied; in the polyzon there is a horseshoe-shaped or circular series of tentacles round the month, which are extremely sensitive. This arrangement of feelers around the mouth is so general a character of fixed animals. that there is a striking similarity between the outward form of these polyp-like creatures and the fixed animals of the sub-kingdom coelenterata, although the essential organs are quite different,

The articulati (though some of them are softskinded) are for the most part covered with a hard borny' covering, while it is as resisting as plates armour. It is therefore necessary that these animals should have special organs of touch. We have already referred to those of the lobster and its tithe in-a former number. Insects have developed from their heads and month-organs, jointed roles, which have nerves of touch running to them and up into them. These jointed roles are covered with Adverbs formed from adjectives imply a sub-

Dat. löhg (iv löhg xápa), in particular; nöfð (iv: nöfð 284), on find. Acc. pappar (it: pappar löber), a long may, at a distance.

distance.

The neuter of the adjective is often employed as an adverb, as the dative πόλλφ, much, by much; its, agreeably; sards and save, terribly; πόνερα,

whether? initydis, on purpose.

PRV TO PYENCISES

No. 15.—1. From a salor time who he which is heldred con in promising states are not assured who he will individed on the promising states are not assured to the process of the process o

to quals, but whether I speak the weeds of predest men. T. Hours with moderation for friends who are deed, for they are not restly dead, but they have gone before on the same read by which all insulg. A single property of the same read by the same are same as the same and the same are same as the same as

THE ORGANS OF SENSE.—XL

[Continued from p. 212] V.—THE ORGAN OF TOUCH (continued)

In birds the pince of halps is supplied by feathers, The structure of these is very wonderful and benutiful, but a description would be out of ploce here, hecause they are certainly less-efficient metile organs than hairs. Birds' feathers are coarser than bairs; they are less flexible; they are inserted only on certalu parts of the body; and since there must be provision undo for moulting, they are more definitely cut off from the sensitive skin belo For all these reasons they are not good organs for transmitting the souse of touch, although they are ed in much the same manner as hairs. Prohably on necount of this imptitude to transmit impressions, they are somotimes replaced by hoirs In certain perts of the body; but as a rule the whole of the bird's body is encircled with feathers, which lie overlapping one another, ond turned in one direction towards the tall of the bird, in the some manner as tiles on a house-roof. A bird's jaws, instead of being covered with soft, flexible. and sensitive lips, are covered with a hard, horny bill, and its legs, though often devoid of feathers. have to be defended by scales or scates, to prevent the long tendons of their leg muscles being severed. Under these circumstances a bird enjoys little ad-

vantoge from ita.senso of touch. Indeed, it is only in the padded under-surface of the foot and box, and sometimes in the best and tonger-when former is feet from the foot and to the foot and to the foot and the foot and foot and the foot and the foot and foot and the foot and th

in buying for the covering of their hodies no noniducting or heat-retnining substances. Hairand feathers are admirable reteiners of heat; but scales and scutes, though good to resist blows and pressure, allow heat to pass out or in without much resistance. This, of course, is associated with the fact that in roptiles and fish the temperature varies with that of the surrounding medium. It dees not follow; however, that because the body of a fish or lizard is cutirely defended by scales, whose free edges overlap the insortions of those next behind them in a manner which is called "imbricated," that therefore they are entirely without the sense of touch. The scales are developed much as the human mils are, and we know that these pre unselvos imonsible; yet they are so intimately connected with the sensitive parts by which they are rmed, that the nails are the conductors of acut and even morbid sensation. The quick of the nall is proverbially sensitive to pain; witness the common phrase of being weunded, or out." to the quick." Itoptiles, howover, slongh at certain seasons, and the old skin, dissevered from the cutis, adheres to them for some time-in fact, until a new and, complete armour is formed below. During such periods, and inferentially at all times, the sense of uch cannot be acute. Scaled reptiles may be nlive to blows or pressure, but hardly to those sensations of soft touch which convey the most distinct impressions of all to us. These remarks apply with yet more force to the hard, stony sur-face of the backs of crocodiles. The under side of the body of erocodiles is lenthery rather than stony, and lus fewer stony masses on its surface, and this is therefore sensitive. Sir Emersor Tennent gives an unming account of a caiman, which he surprised before it could make its re-The Ceylon erocodile throw itself on its side, and feigned denth; but when it was tlekled under its arm it found the process too much for its gravity, and finally got up and hobbled away. As we before remarked in the article on Taste, the tongue ismailo use of by serpents and lizards to touch objects with; and this is probably its main, if not its only, In conformity with the assertion that noc turnal mimals often have specially modified organs of touch, we find that certain slocturnal tree-snakes have their snouts prolonged into tactile organs.

ions howey matter, this the rest of the body; and considerate the logal nut exposes a matter measurem, and where this, is not the case, the jointed and complete from the constant of the constant of uncontract the discretions and real-times effected by contract the discretions and real-times effected by contract adopter. It is around nonline may position of the contract of the contract of the contract of the Theor are two long many-jointed ones justifier from the local; these are subset the entouries. Another spittle was the contract of the contract of the hyper called the muscling pulph. Another spitthers are called the short just, the service should be contracted by the contract of the co

The collinations, or reconcilities, me so cretised in their mere or less spherral between 6 hard side that a casual observer would suppose them to be suffering servicies, explain of initilleting wounds with their long spines, but insendible to suffer cannotes. This is not the men, however, for they can pretrain through the small holes which perhaps the suppose of the suffering properties. The suppose of the

The sen-memone, with its streaming feelers, lives by feeling; and the whole sub-kingdom to which it belongs is characterised by unimals with largely developed and multitudinous feelers.

Finally, those nationals which we call persons, on recent of the single-condition of their bodin-, can meant of the single-condition of their bodin-, can meant of long feelers. These they often evader so branched and long as to give to the numbs the name of "r-bringody," or "root-footed," because the feelers, which also perform the tunest of test look like the branching roots of a tree.

We have now set before our readers the principal carbo connected with what not called in popular acts connected with what not called in popular acts connected with the called the principal called the called th

To eaable the unscientific reader, and those even

who can do little more than read, to follow us step by step, and appreciate and understand all that has teen advanced, the description of each organ, its difference of formation in man and the anbuals, and the various purposes for which it perves, tas been given in longuage which we lawn carefully sought to render as plain and char and us free from technical terms as possible. When, towever, it has been found absolutely necessary to tre technical name - which are applied by scientific men for the sake of hers by of expression, and a ready means of distinguishing one unhant or organ from muother, by reference to some peculiarity fluit it possesses—the explanation of these terms has been supplied directly or indirectly in the papers in which they occur. The Blustrations, too, tlat mecompany the description of each organ of sense will be found as useful by our renders in candiling them to nuder-tond ult that has been said of their fornation, etc. as the map of a country or the chart of a sea is to blut who would become uequalitied with the physical configuration of the former, or the heights and abysec that He life from view beneath the waters of the latter. It may be us well to remind our repliers that, in order to terrive at a thorough comprehension of everything Sense, they should be studied and mastered consecutively from the first to the last. Under the diagrams that accompany the lessons are given the technical manes of the different parts of each organ under consideration.

SPANISH.-XIII

Positioned from p. 229.] Titl: APVERB (continued).

THEME can be no recular rules given for the position of the interest; in most instances it may vary seconding to the taste of the writer. Some adverte secondly prevede the verte; such are canado, when a large, benefits they applies, scartely a country of the work; a large, benefits; and interrocative mixed; along, where; and negative and interrocative mixed.

Hits es may ignorante, etc us. He abrada may neclemente. I sure translatives felluls.

Adverbs, like indicatives, admit of communicatives.

Al short must he los sementos que de los vivos, des presidentes de la vivos de la presidente dans, theu recette recre platly the dead than the literap.

The advertion is sometimes used in comparisons in a manner that does not tought a negation, in which case it would be redundant in English, and might be properly omitted in Spanish; asEn ninguna parte, sondere. En otra parte, elsendere. En alguna otra parte, some-Poco ha, of late, lately. Poco á poco, by degrees. Por el tanto, on that ground, for the reason. Por entonces, at that time. En ninguna otra parte, nouhere or supuesto, of course.
Or puntos, from one moment
to another.

else. En cualquiera parte, anywhere. En adelante, forward, in the En lo succesivo, afterward, here-

El não que viene, next year. En derechura, by the most direct sway. En reguinen, in skort, briefly. Hasta no mus, to the highest

Hasta que, as fur as. Hoy dia or hoy en dia, zon-a-

Hoy per hoy, this very day. La semana pasada, lost week. La semana que viene, next Sobre seguio, confidently, se-Mucho tiempo lu, long time or reason.
Sobre manera, excessively.
Sobre of, separately, selfania.
Tal vez, parknys, once at a

ago. Monana á la noche, to-morrow night. No bien, no moner, scarcely. No mucho ha, not long since, a short time ago Por atras, behind

Unn vez, once. Ya ha rato, some time aga

Por lo largo, along.
Por razon, consequently.
Por tin, finally.
Por instantes, incessantly.

Por instantes, incessuring.
Por poco, bu little, nearly.
Por nea 6 por allá, here or
there.
Por encima, superficially.
Por encima, superficially.

Pocas veces, seldom.
Rata vez, not often, seldom,
Rato ha, short lime ago.
Sin suclo, without bounds, to

Sin ton y sin son, without rhyme

THE PREPOSITION. The prepositions are employed in such a variety of ways in Spanish and in English, that each one is not always to be rendered from one language to the other by the same word. Thus, de is not always to be translated into English by of, nor of into Spanish always by de. The following observations will show the manner in which these prepositions are to be used:-

. About, when it means through, is rendered by por; when it means on, by sobre; when it means within,

by en; when it means of, by de; as-Ella lba cantan o por el lugar, ellos están en ol palácio, they no combon the policio, they combon the policio combon the polic

Above is rendered by sobre : as-

El ave vuela sobre la tierra, The bird flies above the earth.

Against, meaning in spposition to, or contrary to, is rendered by sontra; as-

Ellos pelearon contra les Meji-cauer, they fought against the Mexicuse. After, meaning later in time, is rendered by

despues de; when it means according to, hy a or segun; and when it means immediately behind, by tras: as-

Despues de las seis, after six Begun este modo, after this manner. A la moda frimcean, after the French fachion.

Beha la noga trus el chidero, he farons the rope after the blocket.

According to is rendered by segun, and sometimes by para con.; las--- '

Segun les ordenes de V., ac. Para con él no vale nada, cording to the orders of your according to him it is worth

Among, when it means of the number of, is rendered hy entre or vara entre : when it means in the midst of, by en médio de ; and when it means in, by en : 95-

Entre los hombres no hay uno, que ses recto, anong the men there is not one that is upright, Para entre antigos los cum-plimientos con escuendos, among friends compliments

Yo os envio como corderos en médio de lobos, I send you as lambs among wolve. En muchas mecones no lubia.

rey semejante à él, among many mations there was not a king like him. At, when it denotes in or on, is rendered by en: when it denotes proximity, precedes the price of

anything or the time of day, or means in readiness for, it is rendered by a: as-Ellos están en casa; they are Al puente, at the bridge. at konse.

A la mano, at hand, Ellos estáu en paz, they are at A sein penos la finnega, at six Juan esta en Roma, John is at A has chatro, at four o'clock.
Rome. Esta a mi mando, he is at my Ellos estan en la mar, they are

Al trabajo, at work. Before, meaning in the presence of, is rendered by ante; meaning in front of, or the opposite of bekind, by delante de ; meaning precedent in rank, or prorious in time (that is, the opposite of after), by ántes de : as-

La cause se livrini, auta les frostraid en hiera delants del fineces, the entire veill les area del Bellor, prustrated en brought before the integes.

La delante de ellos para non-trarre el cumino, ha event be-fore c'hera to, point eut "in tra de los Marquesce van lor l'un plungen, the Drute sake

Lord.

Antes do los Marqueses van los Danues, the Dales take vanl before the Marquites.

Antes do anochecer, before sugnifical. Antes del dia, before day,

Behind is rendered by tras, or detras de ; as-

Tras la puerta, behind the door. . Detras do ellos, behind them.

Below is rendered by debajo de; as-Debajo del lábio, Below the Up.

Between is rendered by entre : ns-Discernir entre lo bueno y lo . To discern between the good and

By, meaning at or in, is rendered by de: meaning future time, when, by para; meaning close to, or alongside of, by junto a; and meaning through, by . 🗗 por ; as--

Stream V sentence junto à la Yo lo necesilară todo para el rentena pieces de sau your- sibando. I eleli racet ii oli by Sco ha hecho rico per males or be dia, de july medilos, he has wade kinstelf par hoche; by without medica means.

Concerning, meaning about or in regard to, is' rendered by accrea de or tocante a : us-

Actres de lo que hemos hab-visão, concerning that which terning (or touching) this we have spoken.

For, meaning during, on account of, for the sake

of, or in behalf of, in exchange for, for the purpose of getting, as by (per), is rendered by per; and when it means for the use of, or with the intention of going to, it is rendered by para ; as-

"Product V. dargine we causti. In greed there, to go for stoney, the second of the state of the

alio para España, he set out for Spain. I will give him my fute for his violin. For is sometimes used in English when it would

not be in Spanish; thus, I want to alight for a moment, necesito bajar un momento. Por is sometimes used in Spanish when it would be redundant in English: as, uno vale por muchos, one is worth many. From, when it means since, or from the time of.

and of distance from, is generally rendered by desde : in other cases by de : as-

Hay chonenta mills deed Desde la nifiez apren Vene Cruz a Jalapa, if is fifty sities from I'ere Cruz to, had thou hose kn Jalapa.

Counto la vuello V. del campo e chendid you return

from the country?

In, meaning in the time of, within, and into, is rendered by cn : when it means through the course of or during, by per ; and when, after superlatives or other adjectives, it means of, by de; as in these examples :--

Este bárrio es de los mejores de la cuntañ, this scari is one of the best in the city. s Acre de génio, austere in elleporttion.
En España, in Spain.
Por la manana, in the morning. En el invierno, un the urinter.

Instead of is rendered by por, and by on lugar do when it means in the place of; as-

Vino el por su padre,
Arquelás remaha en Judéa en
lugar de Herodes su padre,
instead of Herod his father.

Into, when it comes after the verb enter, and when it means inside of, is rendered by en; but after all verbs of motion (to enter excepted) it'is rendered br 4: as-

Butromos en esto bo que.

Eche V. arcite en la lampara,
Vamos al comedor,

Let us culer into this grore.

Let us go into the dining-ro

Of is rendered by do; as-

Un amigo del rey. A friend of the king On or upon, meaning along, is rendered by en :

meaning through, by por ; meaning by, it is rendered by de; and meaning in contact with the upper surface of anything, by sobre; as-

Kada debe afirmarae por una mem produbilitad, mothing in their danger ga (or spon) the mem probability.

Bità sobre la silla, it is on (or spon) the clarit.

El 'louium no vive, de sedo expon) the clarit.

Sometimes on is rendered by a; as, a caballo, on horseback; á plé, on foot : á bordo, on board. Upon, after the verbs to count, rely, etc., is rendered by con ; as, conto con la amistad de Diego, I rely upon the friendship of James.

When on in English is used before the days of the week or month, it is not rendered in Spanish; thus, . ella llegó allí el súbado, she arrived there on Saturday.

Out of, meaning removed from beyond and outside of, is rendered by fuera de; meaning on account of: by por; meaning from, by do; as-

Puera de mis alcances, out of Por amistad, out of friendship.

Bebe do un vaso, he drinks out of a tumbler.

Ga tumbler. Tengo habas que están fuera de trerra, I hare beans thot are out of the ground.

Bebe do un vaso, he dribks out of a timbler, are out of the ground.

Bebe do un vaso, he dribks out of a timbler.

Fuera de peligro, out of danger.

Over is rendered by encima de when it means

abore, and otherwise by sobre ; as-Encima de la ventana, over the Lloró sobre la ciudad, he scept telador.

Through, meaning from one end or side to another or on account of, is rendered by por; when it means by reason of, by do; as-

Por el temor de la mucrto esta-ban en aervaluntre toda la vida, through lise feor of death leg were in bondage all listr trembles livrough feur.

Till is rendered by hasta; as-

La oficina está sbierta hasta The office is open till ten o'clock
les des la mocha at night.

To, when preceded by from, in such phrases as from bad to worse, from time to time, is rendered by en: when it means of, by de; and in other cases generally by 4: as-

Un tio de Juan, au unde t De dia en dia, from day to day. Un amigo de su patria, u friend to his country. Dió el tintero á María, he gan the inkstand to Maru.

' Towards is rendered by hacia; as-

Aqui viene hácia nosotros la Here comes torrards ne the lady Under is rendered by debajo de or bojo : as-

Debajo del puento, Bajo la mesa. Under the bridge, Under the table.

Under is rendered by so in the following phrases:-

So capa de, under corer of. So color de, under colour of. Bo pena de, under penalty of. Bo pretextode, under pretext of. With, when meaning of, or from, or by, is rendered

by de ; in most other cases by con ; as-Estamos enbiertos de polvo, Juan le mató de un sablazo,
secare covered with dust.
Nos morimos de frio, sec are
stroke.

Nos morimos de frio, se are dying of cold. Con permiso del capitan, with permission of the captain. Within is rendered by dentre de ; as-

Lo necesitare dentro de tres I shall sted it within three

Without, meaning destitute of, with exemption

from, is rendered by sin; and when it means outside of, or beyond, by fuera de; as-

Trateme V. sin ceremônia, Treat me without ceremony.

Comprar sin dinero, To buy without money. Le ccharon fuera de la ciudad, They cust him out of the city. Sin in Spanish is regarded as a negative preposition, and is therefore often followed by a negative

conjunction; as-Sin etro fin ni metivo. Without another end or (nor)

There are other prepositions in Spanish which, as they can be rendered in most cases by the corresponding English preposition, offer no difficulty to the learner, Such are-

Prente à, or en frente de, Durante, during. [opposite. En orden à, with regard to. Junto à, adjoining. A perar de, in spite of, not-withstanding. Ctara de, near to

The preposition entre, between, when it comes before personal pronouns, does not govern them in the objective case in Spanish, but is followed by them in the nominative; as, entro tu v vo (and not entre ti n mi), between thee and me.

Prepositions, as in English, are placed before the word which they govern.

Care must be taken to distinguish the use of the same word in English, whether employed as a preposition, or an adverb, or conjunction. Thus, in the phrases after breakfast, before dinner, the words after and before are prepositions, and are to be rendered by despues de and antes de, respectively : while in the phrases after I had departed, before I had dined, the words ofter and before are adverbs. and are to be rendered by despues que and antes oue.

Seque, when used before a verb in Spanish, is not a preposition, but an adverb, meaning according as; as-

n ereo, according as I be- Seguu pareció, according as is

THE CONDUCTION.

Conjunctions are simple—that is, such as consist of a single word; or conjunctive phrases-such as consist of more than one word. They may be divided according to their meaning into the following classes :--

1. Capulative, which simply unite words or sentences together; as, y, and; tambien, also.

2. Disjunctive, which connect words or sentences at the same time that they disjoin the sense; as, · 6, or.

3. Adversative, which express opposition of meaning while they connect; as, mas, but; pero, but; sin embargo, notwithstanding,

4. Comparative, which serve to compare words of prepositions; as, como, as; asi, so; como si, as if.

5. Conditional, which express a condition; as, si, if : con tal que, provided that.

6. Concessive, which serve to express something granted; as, aunque, even if; dado que, granted that.

7. Conclusive, which express a conclusion or inference; as, de aqui, hence; por esto, therefore. .

8. Causal, which express a cause or reason; as, porque, because : pues que, since.

9. Temporal, which serve to express a relation of time : as, antes que, before : despues que, after. .

10. Final, which express an end or purpose; as, para que, that, in order that ; a fin de que, to the end that

MANNER OF USING CERTAIN CONJUNCTIONS. Sino, meaning but, is used after a negative, unless

the verb be repeated; and pere or mas, also meaning but, is used when no negative procedes : as-El relno de Dios no está en The Ringdom of God is not to palabras, sino en vittud, Ella es hermosa, pero (or mas) Sise is benutiful, but she is not no es prudente, 'prudent.'

If after a negative the verb be repeated, pero or . mas is to be used instead of sine; as-

Ella no lo dijo a Juan, pero (or She did not tell it to John, but mas) lo dijo a Pedro, she told it to Peter.

Sine, meaning except, is used after an interrogation or after a negative : and ménos, also meaning except. is used when no interrogative or negative precedes. both words being rendered in English by but; as-¿ Quién le hize sine el carpin- IFhe did it but the carpenter? no hay bueno sino solo There is no one good but God

Dios,
Vinieron todos mênos el juez,
They all came but the judge. The conjunction but is used in English in such a variety of meanings that it is necessary, before rendering it into Spanish, to find what other word or words it really represents, as this latter word or phrase is generally that which is used to represent it in Spanish; thus-

I am distant from death, but Un solo peno disto yo de lu (solid) one step,
We have but (no more than)
Rive louves and two fishes,
He arrived but (not fill) yesterHe arrived but (not fill) yesterNo Book danks nyer.

He arrived but does trany source.

The law less does no second shade the law does not does not seen that the law control shade the second shade the law less than the law law less than the law

It will at once be perceived that the irregularity in the use of the word but is obsigeable to the English. not the Spanish language. In the latter but is notused with ten different meanings as in English.

The conjunction unless is to be rendered in Spanish by a menos de que, or by the word or words which it really represents : as-

He will do nothing unless you Nada hard, a ménor de que speak (naug speak) to him.

1. k hable, i Nome and not these universe (N not) possede hacer estos melauniverse (N not) God be (chould be) with him, be with him, be with him.

The conjunction except, when it means the same as unless, is rendered in Spanish in the same manner; and when it means privation-as, for instance, in the sentence "I bought all his books except the histories"-it is rendered by menos, less, minus.

The conjunction whether is to be rendered in Spanish by si or que, and sometimes by the subjunctive of the verb ser ; as-

I doubt whether (that) thou Dudo que tengas aceite,

I consist whether (find) thou Dado quie targus acelle, inert any oil, ment any oil, ment any oil, a preparable in monther vanid come, which we have a ment of the white he may have grape of the find on the such of the constant of the const

The conjunction as is rendered by come when used by way of comparison, by ast come when followed by so, by quando when it means when, and after misme by que; as-

John is an' strong as a lion.
As molesty attracts, so dissolutioness repels,
He raw her as (rehen) he was

Janua es tan fuerte como un leon.
Así como le medienta atrac, así
haye la disolución.
Le rés cuando tés d casa.

going home, It is not the same to promise No as le misse prometer que cumplir.

The conjunction neither, followed by nor, is rendered in Spanish by ni, and nor also by the same word: as-

Swear not, neither by heaven, No jurets, ni por et cicle, ni por nor by the earth, nor any , in tierra, ni por otro jura-other oath.

At the end of a sentence, neither, and also either, if preceded by a negative, are rendered by tampoco :

She will not do il, nor he Ella no guiero hacerlo, ni di either (or nelther), fampros.

The conjunction either, followed by er, is rendered in both eases by 6; as-

Either he is a knave or he is a o es picaro d es tonto. The conjunction both, followed by and, is rendered

by asl or tante, and the and by come : as-Both in time of peace and in Tanto en tiempo de paz, como en-time of war, Eoth John and James will be Ast Juan como Diego estarán

These examples might be rendered by as well as; thus, "in time of peace as well as in time of war," "John as well as James will be here."

* The first as is here an adverb, qualifying the adjective strong.

The conjunction lest, when it means for fear that. is rendered by no sea que; when it means in order that not, by para que no ; and when it means simply that not, by que no; as-

Thou will accompany him to the bouse directly, test any of restants, no cre, que le section to shop, lest want may no coppress thee, we were careful lest you were careful lest you where careful lest you.

The conjunction rather, when used in the sense of but, is rendered by antes or antes blen ; as-

I do not owe him anything; Yo so le debe unda, antes bien rather beowes mesomething. et me debe ulao.

tase

.THE INTERJECTION.

The position of the interjection in a sentence is determined by no fixed rules, but is allowed to vary. as in English, according as harmony and propriety may require.

The interjection etc, lo, bokold, is used with the first objective case of the personal pronouns only, being joined to them and forming one word; as-

Etemo ' behold me / Etele | behold him / Etela | behold her ' Etelos que vienen! le they-

The interjection he, see, beheld, is prefixed to the first objective case of personal pronouns, and precedes adverbs, such as agai, here, alli, there; as-

| Hele aqui | here he is ! Helos alli! there they are!

More literally these exclamations might be rendered, "see him here!" "see her here!" "behold them there!"

When adjectives are employed as interjections. they are followed by the preposition de. if a noun or pronoun come after; for example :-

t Deserneiado de mí (Unincky me! (or unfortunate that I am') The interjection ay is followed by de when used

before a noun or pronoun; as-1 Ay de mil Alas for me ! (or wos to me !)

IDIOMATIC CONSTRUCTION.

In Spanish the words forming a sentence are usually arranged in the order in which they modify each other-first the subject, agent, or nominative, then the verb, then the object of the verb, and lastly the indirect object-to each being annexed the words specially modifying it. But the laws of coustruction not being so rigorous and invariable as in the English language, the subject frequently follows its verb, inversion not being confined to poetry or considered peculiar to the interrogative.

INVERSION.

Inversion is obligatory in the imperative; as, vengu V. con Dios, go with God; venga V. ach; come hilder. But this inversion is permissible chiefly in the following instances:—(1) At the chiefly in the following instances:—(1) At the beginning of a negative sentence; as, no me guitat la grant varieties of a gent varieties of part varieties of food does not please not. (2) In sentences beginning up that and when it, as, amongue est V. illuminously negat astrop; ya ratio muerto, he is already dead. (6) In the latter clauses of a complex sentence: as, para ser polary, est unclude to lo que god at for a power man, he speaks sured.

The article is omitted after a verb of motion, with the words case, inice, pasce, and a few others; as, salgo de case, I come from home; vamos ú misa, let us on to mass.

Adjectives are generally placed after the substantice which they qualify; in some cases their meaning varies with their position; while the cardinal numbers, words expressing some inherent relation of the noun, and a few others generally proposed.

An active verh governs its object with a proposition, if the object by rational leing; as, must alproplum, to here one's neighbour; observer of alguno, as hade nomenon. As an exception to this rule, certain verbs admit no preposition; is, it been benrow analyses, they have good priends; compare tolomalizes, I compare men. In all other instances the vert governs the other threathy.

When there is no inversion, the solverh succeeds the verb it modifies. When decying or affluring, the adverle follows the verb; in compound tenses it follows the participle, but never the auxiliary verb; as, cl which in established simples su localon, the boy has alread actual his darks.

Some deviations from strict grammatical arrangement are allowable in Spanish, as conducive to heartly or energy of expression, which, however, may be better acquired from practice and observation than from any rules that may be half down.

ENGLISH LITERATURE.—XVII.

(Contored from p 279)
THE REVOLUTION AND THE AUGUSTAN PERIOD:
PROSE WRITTERS.

Tuit central figure in the world of throught and of the test and for the test in the world of throught and for the test in the years which follows: which follows the this throught was that of John Lorde, who was born in 152, where the test is the test of the test in 152, and the world of the test in 152, and afterwards at Curst-church, Oxford. At Oxford he appent many years after low but laken his elgence, and expert amony years after low but laken his elgence, and except the support that years after low but the study of natural which he escence and exceptions and exclude an advertise in which he will be the study of the test
became very proficient. After the Bestoration,

Locke was frequently employed in the public

service abroad and at home; and was involved in

the political conflicts of the time, attaching himself to the cause, and following the fortunes of Lord Shafterbury, the able and umbitious leader of the Protestant party. After the final fall of Shuftesbury, and the triumph and accession to the throne of his enemy, the Dake of York, Locke's position in England became musafe, and he retired to Holland, where he remained as long as James II. occupied the throne, In 1688, immediately upon the elonge of government, Locke returned to Eugland. He was soon appointed to an important and lacrative post in the public service, as a member of the Conneil of Trade, an office which he retained as long as his health allowed of his doing so. After leaving the public service, he passed the remaining. years of his life in the country in learned retiremeut, ' He died in 1701,

Locke's "Letters on Toleraflon" constituted the 'most systematic and philosophical argument in favour of toleration which had us yet appeared. His "Treatise of Civil Government" is an attempt to determine the true basis on which civil government rests, and the limits within which it ought to be restricted. Very similar in spirit is the "E-say on Education," which shows much liberally of spirit und a strong desire to throw off the narrowness which distinguished the system of education prevailing then even more than it does in the present day. The " Essay on the Reasonableness of Christlanlty" is a calm and serious argument on the subject which its title expresses; and it gives a greater Insight into Locke's religious views and feelings than my other of his works.

But the work which has secured for Locke his great and lasting reputation, and given him u place mming the greatest blukers, is the essay "Of the Coudnet of the Understanding," A critical examination of this remarkable hook would be out of place here.

In the domain of mathematics and experimental philosophy the genius of Sir Isaac Newton stood supreme at the same epoch; nor did he stand by any means alone in the cultivation of these branches of science.

Amont the docinine a high place must be asslured to Gilbert Burnel, Bishop of Salisbury. Burnet was the redictions and itser of the Princers Mary in Holland, and came with her to England on the accession of hersell and her busland to the throne; and was soon after rate-set to the explicit burnel. As a fleedoction he is best known by his "Exposition of the Thirty-sub-Arribes." But his most important of the Princers of the Princ

One of the most eminent and probably the ablest theologian of the school which became predominant at the Revolution was Isaac Barrow, though he himself died too soon to witness that great event. Barrow was born in London in 1630, his father being a linen-draper in that city. He received his earlier · education at the Charterhouse, and afterwards was entered first at Peterbouse and subsequently at Trinity College, Cambridge, Cambridge was thenceforth his home for many years, during which time his fame as a profound scholar and linguist, as well as a man of great scientific genius, especially in the department of mathematics, became widely known. He filled the post of professor of mathematics, and as such was the teacher of the great Newton, who succeeded him in his professorship. He was subsequently chosen as Master of Trinity College. His sermons will always rank with the writings of Hooker and Jeremy Taylor, the great classics of the English Church. Barrow died, at a comparatively early age, in 1677.

Archbishop Tillotson enjoyed during his life a fame and estimation as a preacher surpassed by few, and was among the most inflaemtal obstrohmen of his day; nor has the popularity of his writings altogether passed away. He was a man of great liberality and tolerance, and was raised to the archbishorde of Cantefoure by William III.

Of a very different school was Robert South. He was the son of a London merchant, and was born near London in 1633. Having received the rudiments of learning at Westminster School, he went to Oxford, and maintained his connection with that university for many years. . He adopted the views of the courtly and anti-popular party, and took an active part in the conflicts of the time. After the Restoration he became chaplain to Lord Chancellor Clarendon, and, partly through his influence, received several successive preferments in the church from the Government of Charles II. The latter years of South's life were spent in retirement, and he died in 1716. His fame as a preacher was very great, and his sermons may still be read with great pleasure for the force and beauty of his style. .

The most eminent in literature of the churchmen of the next generation was Bishop Berkeley, a man equally distinguished for his genius in science and philosophy, and for the purity and nobility of his life and character. It was not without reason that Pope attributed—

"To Berkeley every virtue under heaven."

George Berkeley was born in Ireland, in the county of Kilkenny, in 1684. He was educated at Trinity College, Dublin, of which college he in due time became a Fellow/ He then commenced those philosophical writings which have secured his lasting fame; and upon his removing to London a few years later, he was eagerly welcomed by all those most eminent in the world of literature and thought. The lofty carnestness of his character impressed the most frivolous, while its beauty and gentleness conciliated the most hostile. But Berkelev was not one of those who sought to use their popularity to secure nny personal advantage. Having been promoted to the deanery of Derry, a lucrative as well as dignified post, he resigned this office with all its advantages, and abandoned that position in society which he was so well qualified to adorn, in obedience to the guidance of conscience, and went out to the West Indies, to place himself at the bend of a sort of missionary college, intended to facilitate the Christianisation of the natives of North America. But the miserable pittance which had been promised to Berkeley for the maintenance of his college and the support of himself by the Home Government not being paid him, the enterprise failed, and he was forced to return home. He afterwards became Bishop of Cloyne, in Ireland. He died in 1753. Although it would be a grave emission in these sketches of literature if we were to omit so great a writer as Berkeley, it would not less be a departure from our plan if we were to attempt any analysis of his philosophical system, or any criticism of his writings.

Few careers have been more extraordinary in their vieissitudes than that of Henry St. John, Lord Bolingbroke. Born in 1678, the son of a baronet of ancient family and competent fortune, though he early gave proof of the possession of brilliant ability, he was in youth little distinguished except for his extravagance and dissination. But having enteted Parlinment and devoted his grent energies to politics, he was soon without a rival in cloquence. and all the brilliant qualities which contribute to parliamentary success. He was a leader in that remarkable literary circle of which Pope and Swift were members. He had early allied himself with Harley, afterwards Earl of Oxford, and they soon became the leaders of the extreme Tory party. In the administration of Oxford, St. John, who had been raised to the peerage as Lord Bolingbroke, held the office of Secretary of State, and as such bore the chief share in bringing about the peace of Utrecht. On the death of Oneen Anne and the accession of George L. Bolingbroke was disgraced and impeached, and fied from the storm. That he had been guilty of maintaining a treasonable correspondence with the exiled Stuart family there can be little doubt, and the unpopularity of the peace which he had been instrumental in bringing about exposed him to the indignation of the country.

He was condemned in his sheenee, and jassed many years alread, for some time being actually in the cumployment of the Pretender, though he soon apartyled with him, and was sever after loud in his condemnation of Jacobites. After some years his attainder was reversed, and he was canabled to return to England. He strow heard to regain the political influence without he and one enjoyed, but in varie, and the closing years of his life were spent in retriement. He field in 1751.

Bolingbroke's works were numerous. Many of them were addressed to merely passing questions, and are now of little interest. A very large proportion consists of attacks more or less disect upon Sir Robert Walpole, Bolingbroke's great rival and enemy. Others again, and these were polished after the death of the author, are attacks upon roligion; for in matters of religion Bolingbroke was an avowed: unbellower. The most permanently interesting of questions and political principles, such as his "Letters on the Study and Use of History," and his "Letters on the Study and Use of History," and his

ADDISON, AND THE ESSAYISTS.

Joseph Addison, the son of the Rev. Launcelot Addison, rector of Milston, Wilts, was born in 1672. He received his earlier education at the Charterhouse, from which he removed in due conrsc to Magdalon College, Oxford. Before his university career had finished, Addison had acquired a reputation extending beyond the limits of the university. as a most finished scholar and a young man of rare promise. He was early taken under the patronage of the great Lord Chancellor Somers, and thus obtained the means necessary to enable him to travel for several years upon the Continent. On the death of William III., and the accession of Queen Anne, Addison's friends ceased to be powerful, and for some time he felt the change severely; but in 1704 he was applied to by Godolphin, on behalf of the Whig Ministry then in office, to write a poem in honour of Marlhorough's great campaign in Germany, which had culminated in the victory of Blenheim. This was Addison's first really important literary venture. The moment was very favourable; the party in opposition were making persistent efforts to depreciate Marlhorough's achievements; the Ministry were very anxious to meet these efforts quickly, and secure popular opinion on their own side; and they attached great importance to the projected poem. Addison's work was a complete success. To a modern reader it is almost intolerably stilted and unnatural, and in truth deserves what was said of it not long afterwards, that it was a "gazette in rhyme." But it suited the somewhat stiff and formal taste of the day. Indeed, the connections which it contributed to establish were the foundation of most of Addison's subsequent advancement. Addison's advancement in the public service was steady-and rapid. He became first Secretary for Ireland. In 1716 he was married to the Dowager Countess of Warwick, a union which does not seem to have conduced to his domestic happiness, however it may have assisted his rise in the public service. In 1717 he was advanced to the dignified and responsible post of Secretary of State. But Addison's diffidence, and even awkwardness of manner, making him a very inefficient speaker in Parliament, disqualified him in many respects for this office; and there can be little doubt that a consciousness of his defects must have combined with his declining health in inducing him to relinquish office and retire upon a pension, after a short period of service. He died soon afterwards, in 1719.

Amongst Addison's postical works, we have hiredy mentioned the one which was at the time the most successful, "The Campaiga." He was, besides, the author of many short occasional places of inferior interest. The words writine by his for the open of Reseased are of much the same character as other pieces of the same kind, and would scarcely have been remembered now had anyone of less remutation than Addison been the surther.

In the more formal drama, Addison's two attempts are the commody of The Drewsen-a slight place, are the commody of The Drewsen-a slight place, displaying much of Addison's humour, but fearned to be called a success as a play-and the far more ambitions tragedy of Catto. Few plays have excited more atter since, or have been, in one sense, more successful than this celebrator't tragedy. But the play has resulf pilets to recommend it. Dramatic her play has resulf pilets to recommend it. Dramatic or proposed sciences in searcely attempts; it is a tissue of proposed sciences in searcely attempts; it is a tissue of proposed sciences in searcely attempts;

It is as a prose writer, and not as a post, that Addison has canned immortality. His longer treatises—his "Travels in Haly," and his "Essay on Medials," of which the chject was to show the importance of ancient medials, as throwing light upon ancient history—give evidence upon every page of Addison's delicate trate, finished scholarship, and muinte acquaintence with ancient literature; and their style is heautifully clear and simple. But these works are at the present times aimen forgotten. Those by which Addison is now known are his numerous short essays contributed to the three successive series published under the titled of the Tatter, the Spectater, and the Gravation.

. The Tatler was projected and started in 1709 by Sir Richard Steele, Addison's colleague in many a literary work. It was published three times a week

in the form of a small sheet. Its success was very great, though its fame has been eclipsed by that of its more calchrated succe-sor The Tatler lasted for nearly two years, and was then discontinued. In 1711 Addison and Steele together started the Spectator. This was a bolder speculation than the former, being issued every day. It was continued till the close of the following year. Its success was immediate and unbounded. The Tatler had been commerced not less as a vehicle for news-a record of all that could interest the town from day to day-than for the purpose of serious criticism and discussion. The Spectator, on the other hand, was from first to last the same in character. The daily sheet contained always an essay on some subject literary or social, a satire ou some popular vice or folly, a story, a fable, sometimes even a religious meditation. The whole is connected together by the slight framework of a group of ideal characters, whose impressions and opinions are brought before us in successive numbers. The imaginary Spectator himself, who provides us with this fare, is a man who has seen much of the world, who, now living in London, takes his part in all its pleasures and pursuits, but who through all remains a silent observer. Ho is at home and at ease only in the society of the club, formed by a small circle of intimate friends. Among these friends the most notable is Sir Roger de Coverley, a beautiful picture of an old-fashioned country gentleman. The Spectator himself, with his bashful slience, his close observation of men and things, and his quiet humour, has been thought to be a portrait of Addison himself drawn by his own hand.

ELEMENTARY POLITICS.—IV. (Continued from p. 247.)

FORMS OF GOVERNMENT (continued).

OF Democracies, or Democratic Republics, there

have been two great types in history-"the primary democracy" and "the representative democracy." The first is the democracy of the ancient Greek and Roman world, possible only in small simple States consisting of a single city with a few square miles of territory. In it the sovereign power was in the hands of an Assembly in which every citizen had a votc. There was a sort of Executive Council or Standing Committee, commonly called by historians a Senate, whose chief duties were to transact the minor business of the State, and to prepare motions and to put proposed laws into proper form. But the laws were voted, at least in principle, by the Assembly of the whole body of citizens; though sometimes their final form was settled by a special committee of "Lawgivers" (Nomothetae). And,

while a good deal of the judicant business was delegated to judges, or 10 courts which were virtually committees of the Assembly, the principal cases were tried, and the most important steps in executive government taken, by the Assembly itself.

It is obvious that this form of democracy implies (1) that the citizens all live within easy reach of the capital; (2) that they have plenty of time to devote to politics. Both these requirements were fulfilled in ancient Greek States, which were very small: and very many of the cirizens owned slaves, while many others lived in part on the revenue of the State, which was derived from its lands, or from the tribute of conquered countries, and paid to those who did political or judicial work, or sometimes distributed among the whole civic body. In modern times States are large, and most of the citizens have to work hard for a living The only approach to the old " primary democracy " is an certain cantons of Switzerland, which are not sovereign States, because Switzerland is a Federation. Thus, in Uri and Unterwalden, every year the whole body of citizens meets, clects its executive officers, and passes new laws.

Modern democracies generally, therefore, are representative—that is to en, the function of legislation, and the general control of the executive and judicial authorities, are execused by a Legislature composed of persons chosen by the ininbitants of the several electoral districts for a term of years.

It is generally understood that these persons, as the phrase goes, "are representatives and not delegates "-that is to say, that the electors give them a wide liberty of decision as to the way they are to vote. It has been said by Montesquieu and others that the electors, knowing the needs of their various neighbourhoods and the characters of their neighbours, send up a trustworthy neighbour to act as their agent. But, except in the United States, candidates very often do not belong to the district they aspire to represent. And electors would scarcely be human if they trusted their agent so completely as not to give him some sort of direction as to the line they wish him to take; and of course this takes the form of asking him if he will support or oppose certain proposed legislation. and taking a pledge from him that he will do so. Modern democratic government-especially of the Parliamentary type-rests on the belief that the electors do not leave their representative complete freedom, but require him to pledge inmself to support a certain line of policy. Were they not to do this, Parliamentary government would be utterly unstable. Nobody could predict what groups the members would form. Besides, the educational value of the suffrage would be lost. In two cases in Krance since 1870, the State was not far from a scrious crisis-because many of the electors had voted for the leading men in their district irrespective of their political programme. And a large number of these men happened to dislike the existing Constitution.

At the same time, a constituency ought to recollect that, except on questions which are vital to the cristence of a political party, it is well to leave the members as free as possible. It is folly to leave the members as free as possible. It is folly to leave the members as free as possible. It is folly to leave support a propoul rivhol may interests some one elses. The danger is that by so doing, either a representative who distagrees more on the greater questions with the majority of the elseviers may be introduced; or that one may be acceted who will give phologies freely just because on most of the quotions be is asked he has no dededed views at all

The existing French Constitution provides for the independence of members by declaring that "any imperative mandate is null and void." That is to say, if the electors give their member a direction—other before or after his election—that he is to vote, in a particular way, he must not pay any attention to it, but must vote as he thinks right.

In theory, of course, the member everywhere acts in all non-party matters as the member for the whole con-tituency. He presses on Parliament and the Ministry of the day the interests and views of his special electors, according as the district is agricultural, industrial, mining, or whatever it may be. But attempts have been made to get rid of the inconsistencies caused by the system of local represcutation, and to secure that the will of the people shall be really expressed in the acts of the Legislature. Members are now elected for very complioated reasons-personal character, or local influence, or sometimes less ereditable reasons-as well as in order to vote for a certain policy. And in many cases personal and minor preferences dominate political. It is always a great step towards success to get a "strong local candidate," however keen the electors may be about political issues For there always are some electors (and the fact is to be lamented) who do not care about politics. And it is always possible thatexpecially on some matter which has not been much discussed-the majority of members may, after all, be found to think differently from the majority of the electors. Again, with constituencies of different sizes and elections fought on party lines, it is not ab-olutely impossible that most of the very large constituencies may vote one way and most of the amuller ones the other; so that if the smaller ones are much the more numerous, a majority of representatives may actually represent a minority of

electors. Besides, the electors who vote for the unsuccessful candidate have no direct means of making their political will felt at all; they try to, and fail.

"Proportional" (or "minority.") representation is a means of escaping from the latter difficulty, and an indirect means of securing that legislation shall really be in accordance with the popular will. The Referendum and Initiative are more direct means of securing the latter. Let no scelar with them first.

The "Referendum" exists in Switzerland, both for Federal legislation and in most of the cantoms. Any change in the Constitution, after it is adopted by both Houses of the Legislature, must be submitted to a vote of the whole body of electors. If a majority vote 'Nex', it becomes law, but not otherwise. And any law passed by the two Houses max' be submitted to a popular vote, provided a certain proportion of the electors sign a formal demand, it is not that the contract of t

Now nothing could seem fairer than this. Here is an opportunity to assertain what the majority of the people really wish. In voting for a representative some vote for him for one presson, some for another, most people for several réasons. Nobody can say exactly, for what reason he is at hair elected. Very likely some of the hawn for which he works have not bount thought of at the time of is a distinct same presentated to the people. Do you argue to this or do you not?

Unfortunately, the results are disappointing. By December 31st, 1898, there had been 14 such votes on proposals to alter the Swiss Federal Constitution. In eight cases the proposal was accepted, in six rejected. Of 208 laws which might have been voted on, had a sufficient number of electors or cantons demanded it. 26 had been: 17 were accepted, nine rejected. Many good authorities hold the system is bad, because this involves a good deal of maste of power. The Legislature spends a grent deal of time in studying a question and doing its best to solve it. Then the people may upset all the work of their own agent. And, unfortunately, the majority which upsets the work probably contains .. many more people who do not understand politics than the majority at an ordinary election. Such people very often will not vote at an election because the questions are complicated and there are many together, and they do not care to attempt to give them their

*The Swiss Federal Electorate in 1898 numbered about 700,000; 39,000 electors must sign the demand for a Referendum, 60,000 that for an Initiative. attention. But every law proposed is capeble of luving objections of various kinds suised tot. And if you tell people who do not know anything about a proposal that there are certain advantages and certain objections, the probability is that the objections, (the probability is that the objections, (the objection period by put) will carry the day in their minds. And as there is only one first impulse of mest, people on being asked to agree to anything that they do not understand such about, its very naturally to say "No."

The "Initiative," which exists in some of the Swise cantons, was introduced into the Swise Federal Constitution in 1891. Suppose a large proportion of electors wisel for legislation on a given subject—let us say a law providing that everyone shall receive a peasion after a certain age. They sign a formal demand and present it to the Legislature, which is thereopen bound to do its best to satisfy them. In some of the Swise custors a new Legislature must also be elicent to carry out the Referendum. In the Federation, the plan has not proved every satisfactor; it seems too likely to give special every satisfactor; it seems too likely to give special every satisfactor; it seems too likely to give special every satisfactor; it seems too likely to give special every satisfactor; it seems too likely to give special every satisfactor; it seems too likely to give special every satisfactor.

Minority representation would require far more elaborate treatment than is possible here. Most complicated forms exist in Belgium (for municipal elections) and in the Swiss canton of Tieino; in England there have been two-the "three-cornered system" applied to certain large constituencies from 1865 to 1885, in which the constituency returns three memoers, but each elector can only voto for two candidates; and the "cumulative vote," familiar in School Board elections-while a still more elaborate scheme, invented by the late Mr. Hare, is called proportional representation. Under this scheme any elector can vote in the first instance for any candidate, whether in his own constituency or not. But if the plan stopped here the best-known candidates would be a very long way shead, and many votes would be simply thrown away in swelling their majorities. So it is proposed that a certain number of votes-perhaps the whole number of registered electors divided by 670, the number of members of the House of Commons-should entitle a caudidate to election. Any votes over this number should be transferred from that mem-

"An approach to the principle of the Referendum counts in Englash local government. A free library supported by the rates council be established in any parala nulses it is voted by the raterycers. In the United States laws passed by a State Legislature sometippes contain a clause providing that they shall not come into force unless approved of by a popular vote. ber to some other candidate if 'the ciccorr had so directed. Thus a supporter of the Ministry of the day might show on his ballot-paper, which would be arranged for the purpose, that he wished to wee, for instance, (1) for the Prime Minister; (2) for the Chancellior of the Exchequer; (3) for some leader of the temperance party; (4) for some representative of the temperance party; (5) for some representative of the decision of the temperance party; (5) for some representative of the decision of th

The great objection to all these schemes is that ' they are very difficult to work. It is great waste of power to have a scheme the purpose of which the political party managers on each side will certainly do their very best to defeat. That has been the ease with the first two; probably it would be the ease with the third. There is another and more serious objection. Democratic government, as at present understood (especially the Parliamentary type of it). involves party government. That is, there are certain great definite issues before the country, and representatives take sides on them. But if the two latter schemes were applied to Parliamentary elections generally, there would probably not be two great parties in the Legislature, there would be a multitude of little groups, many of them returned not because of their views on the great issues, but because of their views on secondary issues. A House of Commons would contain, besides Liberals and Conservatives and Irish Home Rulers, a rather large group of members who were first of all members for the temperance party, another group whose first business it would be to oppose the temperance party in the interest of the liquor trade. some members who were, first of all, anti-vaccinationists, and perhaps a dozen or more other little groups mostly representing different trades and professions, who might often be quite unpledged on some of the leading questions. Each side, would make bids for the support of some of these groups by offering to fall in with their views to some extent. Nobody could say how long any Ministry would have a majority or what chance any Bill had of passing.

. "A body," says Looke, "must move whither the greater force carries it, which force is the consent of the majority." Where is the "majority" under proportional representation, and why does it consent? And does it really represent the electorate?

THE CASE FOR DEMOCRACY.

Why should the attempt be made to express the popular will at all? It has been said that "the voice of God.". No statement can be more absurd. History shows us

hundreds of cases—the rise of Christianity is the most importan—in which the party eventually acknowledged to be in the right has for a long time been only a small and presented inmority. Great trades are first seen by such minorities, and it is their energy which converts the rest of the world. Why should not the decision on the most difficult and uncertain of all previous—those of politics and/ social seignes—be left to a select few of the wisest concerned the nurse to observate on the contraction of
Or it may be said, again, as it was said by the great Greek thinker, Scortus;——Politics is the only business which people think can be undertaken vithout appronticeship A shoenaker does not begin to make shoes until he has learn't somethings about this business Yes anybody thinks he can give his opinion on the affairs of State, and many people seem to think they are quite competent to conduct them as well as the Government."

This last way of putting the objection to popular government overlooks the fact that the actual work of administration is a modern State is really carriedon by skilled and trained persons. The voters know very little; the politicinas who make speeches and become their representatives necessarily pick un some knowledge, it is the ablest, on the whole, of these politicians who conduct the Governmentthat is, decide broadly what measures shall be taken and what laws passed But the actual work of earrying out their orders is in the hands of trained and skilled persons-the permanent Civil Service. And the "members of the Government." in all important questions, consult the heads of the dopartments of that service and consider their advice. A new Postmaster-General, for instance, would usually be quite "at sen," had he not permanent officials to teach him the business of the Post Office. If he wants to introduce a reformthe Parcel Post, for matance-he sets these officials to work to estimate the cost and draw out a scheme, Then he considers their scheme and their opinions. In planning or deciding on a scheme, he is somewhat in the position of the capitalist-employer, or extrapreneur, of whom we spoke in the Political Economy lessons. To go back to the shoemaking illustration: the voters are the enstoners, the Executive Government is the firm that takes the order, and the Civil Service is the workmen who carry it out. And the voters-who pay taxes -are entitled to say what sort of shoes they like and whether their shoes pinch

In a Greek State—such as Athens in Socrates' time—there was practically no Civil Service. Every citizen was supposed to have a claim to hold some sort of office at some time or other; and—to give everybody a chance—the less important work was usually performed by committees, places in which were actually assigned by lot.

· But still it may be asked. Why should the right of voting be so widely extended? Why should every adult male, or almost every one, have a vote? In some of the United States the Constitution says that "all men are coual." But this is obviously false, if it means they are all countly wise. It appears to have meant originally, "all men are capable of reasoning, and the differences in their abilities are due to differences of opportunity and information rather than of power." This was a theory of certain Greek philosophers, the Stoles, and is adopted by Cicero. But it does not seem to be true either. In some modern Constitutions the maxim seems to have been intended to mean. As the State is a combination of persons to protect their lives, liberty, and property, everybody ought to have nn equal claim to this protection, and an equal power of enforcing it by his vote. But how if he is not wise enough to judge rightly? Would be not be better off if some wiser person judged for him?

Again, democracies have often been charged with ficklenes. The larger they are, however, the less fickle they are. We can see by watching successive elections in a Reglish constituency that comparatively only a small number of persons really change their minds between one clostion and the lart. Indeed, one of the greatest of recent English writers on political theory—the intel Sir Henry Maine—condenance democracy on the grownd that, in free, the mass of the people are indeficient and in free, the mass of the people are indeficient and to the control of the properties of the people of the p

Now, to some extent, this is true. It is not clear that a democracy can be worked without party passions: the ancient Roman Republic fell partly because the mass of the people got heartily tired of party warfare, and the advent of an emperor, who settled most of the questions they had been fighting about and governed them better than they had ever been governed before, left them nothing to discuss. Again, the enormous difficulty of demoeratic government is the sacrifice of time and labour it demands from the voters. To scenre its efficiency, one must not merely vote for good men. but see that good men are proposed as candidates -that is, go to the meetings of the local branch of ... one's party and see that competent officials are · elected to manage its business, * But very few voters can do that; and it is found that in the United States corrupt party leaders can easily " pack "these

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adjectives, by suffixing -mente, which in Spanish corresponds to dg added to adjectives in English;
May, very, very much, is used to qualify adjectives, participles, and other advertes, but is never used to qualify verbs. Mucho, week, very week, is used to qualify verbs and sometimes advertes of comparison;
                                                                                                                                                                                                                                             berko ; etéchnischita, centalis ; Bentante ; leistinitemente ;
cretalisty. sufficient, sufficient ;
                                                                                                                                                                                                                                      When more adverbs than one ending with -moute
qualify the same verb, the saffix -moute, for the
purpose of preventing a disagreeable repetition of
This or many ries, one is very Lincia lee many blen, Lang reads to the line of                                                                                                                                                                                                                                                           d, is placed to the last adverb only ; as-
                                                                                                                                                                                                                                      MI datase on emplore loss y My intention is so exploin
lineacente, cierriy and parinty.
                                                                                                                                                                                                                                               In all languages there are certain phrases used
May is constinues employed to qualify nones, especially at the beginning of n note or letter addressed in any person; as—
                                                                                                                                                                                                                                      adverbially, the words of which, taken collectively,
                                                                                                                                                                                                                                      have an idiomatic meaning, but taken separatively
would make no sense. Thus in English the ad-
verbial locations by-and-by, at least, none at all,
  May emigo mio, erre work my May some mis, erre much my friend totar friend). gustossu totar str.).
                                                                                                                                                                                                                                        would signify nothing intelligible if taken literally,
           Bien, joined to udjectives or adverbe, is equivalent
                                                                                                                                                                                                                                        word by word; but as advertial phruses, they are
very expressive. It is often thus in Spanish; a
    To very; as, blen rico, very rich; and to verbs, much;
    ns, el bebió blen, ke denak much.
                                                                                                                                                                                                                                        more literal translation of the words will do little
           Negative adverbs and all negations generally pre-
                                                                                                                                                                                                                                      or nothing toward assisting us to comprehend the
meaning. Such phrases will generally be found
explained in their adverbial sense in dictiouries.
  cede the verb; as-
    A ninguou did el libro, te no No puede e-ember, he enemel our pare de the lock, velle, velle,
                                                                                                                                                                                                                                        Some of the most common are given in the following
    If a word implying negation come after the verb,
the adverb see must procede the verb; as--
                                                                                                                                                                                                                                        list :-
                                                                                                                                                                                                                                        A conciderta, constitutionaly,
A in vectors, truly,
A vieta de chois, cridently, of a
ginner.
A subtract, Lusselingly,
du subtract, Lusselingly,
du control of prices.
A subtract,
du control of prices.
A success y sin literary, with
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    No silo el libro à mineratio, de Nu tietro necla, de don maldang, gane ble dook in un oue.
                                                                                                                                                                                                                                        A subtraction, Assertingly,
Al seguno, securely.
             From the last two rules it will be seen that in
    Spanish it can be sald, nada tleme, er no bene
nada, he kas nathing ; a ningano habié, er habié a
                                                                                                                                                                                                                                                 buon reguro, errisinty,
ster con antes, es seen es
                                                                                                                                                                                                                                                                                                                                                    Bezo mane, te en unierke
unner.
Blen cons, just na.
Cunicasi, erry zeoroj.
Cunto intes, na eson os p
    ningano, he spake to nabody; ella nunca ha habbado,
                                                                                                                                                                                                                                                 possiter.
seem, aborn, just neer.
man correct, sellk like where!
    er ella un ha lublado nunca, she has never anshen,
             Nunco, sever, and jums, sever, are sometimes
    both used in a sentence to give additional force to
                                                                                                                                                                                                                                                                                           a. exerperiestic.
                                                                                                                                                                                                                                               ... improvisite, encryected
troubus, of interests.
uns, together, in conjuny.
In continue, continuelle.
bretto, indiscriminatele.
    the negation ; us -
           Nunra james tendri -ed.
                                                                                                            Kever, werer will be be thereby.
           Jamas, news, is used with sigmpre, always, in the
                                                                                                                                                                                                                                               hecus, indiscrimination in Jamos que, in propertion at, pie, on feet.

tases been, early, accountly, is been, at the nick of time, drun though the fire.
    sense of ever and ever ; ns-
    Dies erion pur stemper James, God reigns for ever and ever.
  In interrogative sentences, jawas is rendered by ever in English; as, ; ha jamas hablado? has beerer
                                                                                                                                                                                                                                                                                                                                                                                             re silf. to must fre.
                                                                                                                                                                                                                                      All more bases, since the Alexan Energy bases, since the Al active, seeing able notionals, as the control of the active to the a
                                                                                                                                                                                                                                                                                                                                                                           t coul there,
stee, of old, of your
phicus, continued
    Amilian 2
           Si, yez, and no, ze, when used after verbs in such
    sentences as he replied no, they answered yes, I bullers not, take que before them in Spanish; as-
    Responsibilitation of Levergies yes. He dileton upon no, they teld Occurred no. I think not. we no.
                                                                                                                                                                                                                                      A milion y ofecoron, by fits and
starts.
A is corta of a large, sooner
or interesting.
A prints, fundaments.
A touches, in a proping mander
A reas there, to the utness.
A teart of a function, while
             SI, yes, and no, we, serve to offirm or deny what
    is predicated in a preceding verb without repeating
    the verb : as-
  Yo no so medar, y Jean al, I Ella parela cantar, pero yo no.

Luno not have to switt, and she can ring, but I on and

John short (per).

(no).
             Derivative adverbs are nearly all formed from
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Mejor en el lutre nombre que Briter is a prod nome firm no les réquents.

the Senate, the Popular Assembly, and the City Governments died down and were forgotten, that the despotic and military side of his rule was allowed to appear, at any rate in Italy. Even then its military , origin was explained away by rather fanciful legal theories. Later on this Empire was first divided between soverel rulers who were responsible to the Emperor, and then separated into an Eastern and a Western Empire, whose capitals were respectively Constantinople and Rome. The Eastern Empire lasted on till the Turks took Constantinople in 1458: the Western Empire was overthrown in 476 A.D., though pominally the Eastern Emperor became supreme over it. These Empires together had taken up the whole of the civilised world; and with the growth of Christianity the theory grew up that men ought to be united into one body-ruled over in spiritual matters by the Pope, in secular matters by a single ruler like thoold Roman Emperor-both these rulers holding their power directly from God. Now Charles the Great (or Charlemagne), King of the Franks, the greatest of the monarchies which had risen through the barbarian invasions of the old Roman Empire, had protected the Papal dominions against the Lombards, and Leo III. therefore determined to crown him Emperor (in A.D. 800), and so transfer the seat of government again from Constantinople to Rome. The Eastern Empire still lasted on, but Charles the Great was head of the "Holy Roman Empire," which claimed to extend and to exercise dominion over the whole of Western Europe, or rather over the heads of the various States into which it was divided. This dominion was never complete, and in practice eventually became confined to Germany. The German King came to be elected by various German sovereign princos, who therefore were called "Electors," and was also, when crowned at Rome, Emperor of the "Holy Roman Empire." Attempts were occasionally made by the Emperors to centralise the Government and extend their own powers. But-(1) these all failed; (2) the Imperial dignity at List became the special possession of the Habsburg family, who also ruled Austria, together with Hungary and various parts of Eastern Europe. Napoleon, in 1806, formally abolished the " Holy Roman Empire," making the then Emperor "Emperor of Austria. But partly in imitation of the ancient Roman Emperors, partly to mark himself as the successor of Charles the Great, and partly, no doubt, because he intended that France should be the ruling State in Europe, he took the title of Emperor of the French in 1804. His empire, abolished in 1814, was finally crushed after Waterloo, and revived for nearly nineteen years (1851-. 1870) by Napoleon III.

COMPARATIVE ANATOMY.—XIV. (Continued from p. 251.)

VERTEBRATA (continued).

MAMMALIA (continued).

The Teeth.-For variety and beauty, the teeth exect every other part of the mammalian body. They are confined to the jaws, and arranged in an uninterrupted series. Each jaw is hollowed out into a number of pits, or alveoli, in which the teeth are lodged, connected to the bone through the intervention of a membrane called the periosteum. which lines the tooth socket. Each tooth is composed of dentine, or ivory (Fig. 41, III, and IV., 4, 4). which forms a greater part of its substance. The projecting part, or erown, is covered with a very hard material called enamel (Fig. 41, III. and IV., 1, 1); and the root with a material which is named cement (Fig. 41, III. and IV., 3, 3). The enamel, when examined under the microscope, appears like a number of six-sided prisms closely pressed against each other, and directed perpendicularly towards the surface of the tooth (Fig. 41, V.). The dentino is composed of delicate branching tubes, which run from the central cavity (Fig. 41, III. and IV., 4, 4) towards the surface of the tooth. In the whale the teeth are represented by large flexible plates in the upper iaw, called whalebone (Fig. 41, VI. and VII.). In man, and the higher ages, monkeys, etc., there are in each half of each jaw two front teeth chiselshaped, named incisors, or cutting teeth (Fig. 41, II., 1); a more pointed one called the canine, or dogtooth, for biting, holding, and tearing (Fig. 41, II., 2): two somewhat flattened at the top, with single fangs, called false, or pre-, molars (Fig. 41, IL, 3); and three situated behind all the rest, the true molars or grinders (Fig. 41, II., 4). To express the number of teeth in a simple manner, the following kind of table is used by naturalists, and called a dental formula :--

The indivor textla nevery small in the insectivon, strong and large in the incivious and contents. The canines are large in the carnivorous and some other animals. Fig. 41 (VIII. L. X., An at XI) shows examples of the total in the carnivorous, insectivorous, nectivorous, and frugivorous animals. The narry whal has only two testh. The elephant has skxwiz, an entite moiner on each side of both jawy, together with two tasks of the upper jaw. In reduction, the content of
princary "mostings with their followers, who will of course earry on their plans." Then, worm when a course earry on their plans is the course when a course and their plans is the course of their plans of their plans of their plans of their plans of principle or their plans of principle or Philadelphia and many other American cities were senableously mingoverned for years together were senableously mingoverned for years together were senableously mingoverned for years together or their prity fait that the principles of the prity for their territy worly we now be belonged to their prity fait that the principles of the prity found officials for their early—when years the bow efficials only good wars to hide their subschools except from their early manner of the principles of their prity manner.

SHL, we have to remember—First, the vetergraph tease. We may regard them on elubbing togather to pay thus expenses of the Government; only
us some individuals woodly ended to promess of a
to some individuals woodly ended to promess of a
the complex of the control of the control
to expense shall be met, and complex each meanture to pay his appointed share. Now, each member
ought in fairness to be free to criticoles the arrangereset and the way his mooning the spent. Ho can
write it is more fille words. There should be no
travelies without representation.

Again, truth in a complicated subject like politics is best got by full and free discussion. But what is the use of a discussion which need have no proofleal effect? People who have votes are werth convincing. People who have not, probably have other more pressing things to do than to ilsten to discussions about measures with which they have no concern but to obey them. The wider the suffrage, the more discussion; the better, on the whole, are the newspapers; the more cureful is the study of political proposals; the greater, too, is the number of busy minds at work finding solutious; the mean likelihood there is that men will realise their duty to the State. And besides, how are the wisest and best to be selected? The mind of a " body politio" is not all concentrated, as the human mind is; there is no "sociel broin"; pelitical intelligence is spread through the population, and the wider the suffrage, the more political interest, and the more discussion, the more likely it is to "come out." Moreover, what secority have we that the wisest and best will remain wise and good when placed where they have great opportunities for enriching thomselves and oppressing others, unless they are looked after by those others?

In short, the real value of democracy is its educational ond moral value. Every votes may feel, if he chooses, that he has some part in controlling the destinies of a great nation, and in getting right doos by the Government according to the best of

his lights. And the fact is that the issues ore not so very obscure in the end. As it is obsolutely necessary to convince the voters, a great deal of the best intellect in the country is dovoted to con vincing them. This is good both for the individual voters and the country, because the truth is brought out and the issues simplified. It is not the most ignorant who rule. It is the ablest umong the voters who are convinced, and who convince others by their arguments or their personal influence. If you give the most ignorant a chance of ruling you, it becomes absolutely necessary to remove their ignorance. And so we find that, in England, improved elementery edecation end incronsed freedom of the press have followed extension of the franchise.

After fill, moreover, the voter is reelly conserved more with issues than with persons; and he cen do list duty and help society best by voting according to his conscience, end—last net least—by toking as active on interest in the local findirs of his porty as time or opportunity admits. In politics, the fotal error is indifference.

COMPOSITE STATES -- VERNEAL REPRINCES-

We have you can be all the short Joseph Colors of the control of the colors of the col

locoming a Federation.

The word "Bangere" is decived from a Latin word meaning "Commonder-in-Chief." The railors provided to the commonder-in-Chief. The railors part of their power from the fact that they were commonder-in-chief of an enry, most of it recruited from conceive actuals linky, and then core companies to the common control of the contro

comber of longitudinal folds; the fourth, the renuct (5), named from its property of eurdling milk. The communt swallows its herbaccous food partially amsticated. It descends into the first stomach, or paunch, which corresponds to the crop of birds. . When at leisure, the animal regargitates the food to the mouth. A part is passed into the second · stomach, and there formed into a smooth moistened mass, and then projected into the mouth, where it is now properly musticated, and again swallowed. This time the morsel passes into the third stomach, and, spreading over its longitudinal folds, is prepared for admission into the fourth or true dicestive stomach, and thence into the small intestine. In the camel and dromedary the walls of the first and second stomachs are exeavated into deep cells, wherein water may be retained in considerable quantities. On this account these animals are able to go many days without a fresh supply of water, even during long journeys across the hot sandy clesert. The intestines (like those of man) consist of two portions, of which the first is unused the small, and the second the large intestine. The point of separation between them is indicated by a valve formed by the uncons lining of the bowel, and in some number by a cream, to which is attacked a tail-like process termed the vermiform anpendix. The relative length of the intestines varies. In the carnivora it is from five to lifteen times the length of the body: In insectivora, from three to six thurs : chelroptem, two to seven : ungulata, lifteen to thirty; in the quadrumana, about three to eight thues. The division but large and small intestine prevails with few exceptions throughout the mamuschia. The membrane living the small intestine is elevated into valvular folds, for the purpose of increasing the surface over which the digestive material has to pass; there are also embedded in it small glandular organs and villi. The former secrete a fluid which nids the digestive process, and the latter take into the system, as white blood, food already sufficiently prepared. The large I intestine is succulated. It commences by a blind extremity called the execum, at the termination of which the small intestines open. The execum is not always pre-ent, as in the insect-caters, bats, edentata, and certain of the cetacea; and in other mammals it is variable in length. It is short in the carnivora, yet absent in bears and weasels. In the runinants it is large and capacions. The appendix exists in man, apes, and gibbons, and also in the marsupial wombat, but in no other animal. In the monotromata (ornithorhynehus) the intestinal canal terminates to a closen, us in birds,

The position of the heart is usually in the median line of the chest, lying between the lungs. In man and the higher apes it has an inclination towards the left side.

Merevia System.—As will be anticipated, the brain is found larger and more complicated in these aminals diam in the preceding classes. The convolutions of the brain are more numerous, and increase in complexity, as we ascend towards the higher mammalia, according with the increased including with the increased intelligence which these minants manifest.

The Skeleton, in many respects, presents a close resemblance to that of man, It undergoes, however, many modifications. The skull and face are formed by a series of bones immovably bound logether, and so arranged as to present several compicte and incomplete envities for the lodgment of the delicate organs concerned in the manifestation of the senses. Thus we have one cavity, of variable size, for the brain; another one for the nose; and one on each side of the face for the eyes. The mouth is situated at the base, in the interval between the upper and lower laws. The size of the face becomes larger, and the cranium smaller, as we recede from unu. The invs are always orticulated to the squamosal bone of the skull without the intervention of a quadrate bone, as in the preceding classes.

Some of the manumalia (rambanala) have hores vounceted with the froutin bone. In deer the borns are called antiers, and are replaced ansulty. The borns of the richnecors are unere appendages of the skin. In the goat, oz, and sheep, the borns are bollow, and haved upon an oscosasy purcees, which is hollowed out into cells. These communicates with certain (earlier is in the frontal bone, called shuness. Such horns grow by layers, analogous to ordinary mail, and are never sheel. With the exception of cancels and must keer, all the runhamats are provided with horns.

The vertebral column is made up of five segments. These are respectively named cervical, dorsal, humbar, sacral, and candal, according to their nosition. The cervical are in all but a very few cases seven in number (Fig. 42, XV., 12). The dorsal (13) vary from eleren to twenty, and give attachment to a corresponding number of ribs. Thus, in man there are twelve dorsal vertebra, and as many ribs. The horse has eighteen, and the elephant twenty pairs of rihs. The sacral vertebre are three or more, and are fused together, forming a wedge-shaped bone, called the sacrum (15). The init (caudal) vertebra (16) are represented in man by four small segments. In other mammals there may be as many as fifty. In certain rats they are entirely absent. The weight of the head is supported by a strong clastic ligament, vulgarly termed packwax, which extends between the back part of the skull and the neck vertebra.

Every mammal is provided with four limbs, except the whale tribe, and these lawes only the two thoracie or anterior limbs. The limbs present many possible and limbs, and limbs limbs, the thoracie of the animal. Thus, the thoracie while so care, in quadrupeds, as legs; and in some, as the cut tribe, also as hartunants of affence. In monkeys they are indistributed by the some control of the some control of the some control of the some control of the solid and provess the solid limbs and the solid limbs of the solid limbs provided the solid limbs and provided the solid limbs and the

The bones of the extremities are: first, a broad and expanded bone, called the blade bone (Fig. 42, N.V.. 1) in the thoracic, and the innominate bone in the pelvic extremity. The blade-bone may or may not have a clavicle or collar-bone attached to it.

entail upon him.

The arm and thigh bones are single, and clearly espectively the humerus (2) and featur (7). The foti-arm and leg luve such two bones, vir., natice and ulus (3), and this and flubin (8). The bones of the lund and foot are very variable (6, 6, 10, 11). Man has five digits; the bat also five, to the the third that the third that the form the third that the five of the body, and continued along the whole length of the hind legs. The horse has only one perfect too, and two imperfect ones; the end of the perfect too is endouded in a mass of horny natter, called

a hoof. The toes of the carnivors are armed with claws; and many, as the well-known eat, have their feets padded with an classic cashion, to enable them to treat donelessly, and thus take their proylawing two toes on each foot. Besides these there are a variety of modifications. Some animals walkon the sole of the foot, as man, bears, and badgers, and are called plantigrades. Others walk on the extremities of their toes, as the horse, and many of the carnivors; these are called digitigrades. The carnivors; these are called digitigrades. The expanded late to broat webbod hodge for evinenting is seen to the carnivors; these are called alled for each size of the carnivors; these are called alled for evinenting is seen as the carnivors; and the carnivors and the carnivors are called the carnivors; the carnivors and the carnivors are carnivors.

MANNALIA-CLASSIFICATION.

A very generally adopted classification is that by Professor Huxler. founded upon the ingenious one of the celebrated French anatomist, De Blainville, who divided them into three primary groups, according to

the characters of their reproductive organs, especially the reproductive organs of the female—viz., the Ornithodelphia, Didelphia, and the Monodelphia.

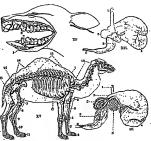


Fig. 42.—Mammalia —XII. & XIII. STOMACH, AND SECTION OF STOMACH, OF SHEEF (AFTER MUNY-EDWARD). XIV. SHOWING DESTITION OF A MARSCHAL (AFTER FLOWER). XV, SKELETON OF A CAMEL.

Ref., to Nos. in Fig.,—XII. and XIII. 1, 1 guillet; 2, 2, thred stomach; 5, 5, second stomach; 4, 5, quanto; 5, fourth stomach; 6, pyperund intestine; 7, erophogoni proors; XIV. 1, 1, permanent, sur 5, 2, decidency tetch; XV. 1, bluel-bows or equiple; 5, humerus femur; 8, this; 1, phalapping; 1, phalappin

 The Ornithodelphia (τορις, a bird; δελφές, a ποπό) comprises those two remarkable genera of mammals, the Ornithorhynelus and Echidua, which constitute the order Monotremata.*

 The Didelphia (δι, two; δελφύς, womb) contains only a single order, the Marsupials.

3. The Monodelphia (udwas, single; takepis, nomb; comprises all the orders of Manumalia with a single uterus, or womb, in which the young are developed and pourished by means of a placenta, which, closely atlashed to the uterine walls, enables the maternal blood to pass to the offspring, and the renternal blood to pass to the offspring, and the veloping tissues, to be removed away from it. They may be arranged thus:—

The Primates, containing two sub-orders.
 (a) Anthropoidea, man, apes, and monkeys.
 (b) Lemuroidea, or lemurs.

* Mésos, single: τρόμα from τιτραίνω, I pierce; having only one opening for the nrinary, genital, and intestinal canals.

- 2. Chciroptera.—Bats.
- Insertirora.—The so-called fiving lemms (galeopitheons); the hedgehogs, shrews, and moles belong to this order.
- 4. Rodontia.-Rats, bares, squirrels, etc.
- 5. Carnirora.—This order contains all the cats, ', hyenns, civets, dogs, bears, weasels, racoons, and souls
- 6. Ungulata.—This order is divisible into two well—marked sub-orders, which pass into watch pass well—marked sub-orders, which pass into consonately. Or The Perisodactyla (horses, thino-corosas, tapits, palasotheria, uncertrasobenia), palasotheria uncertrasobenia of the digit of each foot symmetrical in itself, the third digit of each foot symmetrical in itself, etc. (b) The Articolactyla (hippopotamises, palasotheria, ruuninants). With these may be placed the cleaning and the hymx.
- 7. Cetacea.—In this order the whalebone whales, the dolphins, and the extinct zonglodonts, are comprised.
- Two orders of monodelphous Mammalia remain—, the Sirenia and the Edentata.
- The existing Sirenta are the e-traine, or littoral, dugouge and mantrees. The sloths, the extinet megatherium, and its allies the aut-caters, the pangolins, and the armadilloes belong to the order of Educate.

ENGLISH LITERATURE.—XVIII. [Continued from p. 207.]

SWIFT. JONATHAN SWIFT was of English descent; but his father having held an office in Dublin, the son was born in that city, a posthamous child, in 1667. Hischildhood was passed anid noverty, privation, and embarrassment. His education he received first at a grammur school at Kilkenny, and subsequently at Trinity College, Dublin. Here he not only fulled to distinguish himself by his diligence or attainments. but seems to have left a very unfavourable impression of his abilities. Indeed, Swift's cenius was very slow in showing itself; he was as remarkable an example of late mental development as his friend and fellow-worker. Pope, was of intellectual precocity. Swift was distantly connected by family with Sir William Temple; and not long after taking his degree he entered the service of that statesman. then living in luxurious and lettered case at his country seat in Surrey. Swift's employment in Temple's service was an ambiguous one, something between secretary, literary assistant, and humble hanger-on; and it may easily be conceived how acutely painful such a position must have been to Swift's proud, sensitive, and not very generous nnture. There was everything, in fact, in Swift's

early life and training to embitter such a disposi-

tion as his. And the facts of his history go far to explain how one capable of the depth of tendernies and affection which Swift could show, ould yet have entertained that hatred and contempt for mankind which render his satire not severe merely, but nestitely swarge and ferocious.

Is was while in Temple's service that Swift finit more. Skiter Johnson—then a cray point geth, passing as the dengator of Temple's steared, thought probably, in resultir, a natural dengator of the old non himself. Skie was the Skella whose name must inleys remain associated with Swift's, and whose sal story is one of the most toneling in the whole history of literature. An attachment scores only to the strength of the strength

her only on her dentibled.
After the dosth of Sir William Temple, in 1609, it fell to the lot of Swift to collect and odit the works of his patron; and this appears to have been Swift sirst public appearance in the public of Hierardure, Ille soon afterwards went to Ireland in the espiciely, in the first instance, of chuplain to the then Lord Deputy, and was in time appointed to the living of Lamoor in the county of Month. This was now his home for soon; perma : but his visits to London were frequent, where his great powers gradually became known, and his society proportionally outliered.

among the wits and lifemry men of the metropolis. Ills connection with Temple land naturally introduced this into political life as a NWhg; but Swift, political principles were probably never very rigid, and before very long he took service under the Tory banner, and not once became the most owner between the new temple in the new tem

It was during these constant visits to London that Swift's tonohing Journal to Stella was written, she remaining at that time near his home in Ireland. It was also during one of these visits in the inseame anguainted with the second victim of his affections, Escher Yanhomiejh, the daughter of a wealtly London merchant, who, under the poetical name of Vanes-s, given her by Swift, has become secredy tess famous than the mentypy Stella. Being loft, by her father's death, with a compressed integrated by her father's death, with a compressed integrated at last to desperation by "doubt and justicing," at a last to desperation by "doubt and justicing," and witcom Swift about the same time married), with a worken Swiften Swift and the same time married), with a married, by with a witcom Swift about the same time married), with a

Animals are said; to be monophyrodents that develop a ningle set of teeth, and diphyrodent that generate two sets of teeth. To the first closely the monotrements comitteeyradius and the major developed the control of the will. In heavy of the major in the teether than the control of the will. In heavy of the major in the teether than the control of the will.



"Hereas Beast Torm, It, Takawase Sterens or at Herea Beast Beast Torm, It claimes or the Karat, were regressive or the Boart, Barrier products, Barrier prod

colabilitas), edentiata' (shelih, ste.), and customs (vicinite); to the second all the era's energy than (vicinite); to the second all the era's energy than (vicinite); to the second all the era's NT-5, 29, 175, and (vicinite); the vicinite of the era's vicinite

long stretched canaversally across the types part of the abbendual convention upon a contract of the contract

as Swift can write anything that shall not bave merit of a certain kind; but these are rather the works of a wit than of a poot.

Upon political and privty questions Swift was a most powerful and not very screptious pamplishers; though it must be admitted, that after he had once chosen the Tory side he remained faithful to that party. The most important of his controversial vritings of this class is the celebrated pamplisher on "The Conduct of the Allies," published in 1712, a work which contributed largely to the full of the White party, the chandonment of the White policy, and the triumbul of Harley and Bolingbooks.

Others, again, of Swift's works seem to be almost purposeless, to be written in fit way mantonness of satire, merely because it was a pleasure to "laugh and slanks in Richholsif eavy chair," because lot even to show us the world turned upside down, to stardle us with paradox, to shook our sensibilities, to bring all that is most wenerable into contact with the most centemptible associations. Of this class are like "Argument agains a Mobilising Christianity" his "Argument agains a Mobilising Christianity" his "Notes: Proposel to the Public," and his "Directions."

But there are three in particular of Swift's works npon which his fame with postority mainly rests: "The Battle of the Books," "The Tale of a Tub," both published in 1704; and "Gulliver's Travels," nublished in 1726.

The "Battle of the Books" is one of the many valuable pions which we owe to the great discussion then at its beight—of which the oeigbrated Boyle and Bentley controversy was an episode—as to the relative merits of the ancients and the moderns in the field of literature.

The "Tale of a Tub" is one of the most extraordinary sattires ever written. Its object is to ridicule extremes in religion, and exale what in Swift's elsew such the happy medium of the High Church Angican part." But for can, we think, rend the "Tale of a Tub" without freling that from the nathelous levity with which the whole subject is hardled, the conser afficule withol is thereon over the conservation of the c

The most popular, however, and descreedly so, of Swifts works is "The Travels of Guilliver." It is one of the most comprehensive of satires. Swift, though one of the most original of thinkers, never heatinate to borrow from his predecessors, to several of whom he is largely indebted. But his chief master in satire was Rebeins, from whom he has derived not only much of his manner and style, but even many of his minutes and style, but even many of his minutes and the side of the side

romance of Rabelais; it is less a satire upon particular classes, and more a satire npon human nature. The form which Swift chooses for his satire is one which had been adopted by others before, and has been since—that of imaginary travels through strange regions.

· POPE AND THE CONTEMPORARY POETS.

Alexander Pope was born in London in 1688. His father was a linendraper in the same city, but before his son was of an age to be influenced by the scenes around him, he had amassed a competent fortune, and, leaving London, settled in a country house in the neighbourhood of Windsor. The religion in which he was born-for his family were Roman Catholics-would alone have excluded Pope from the educational establishments at which most of his compects in literature received their early training; and, in addition, the extreme delicacy of his health-for his frame was small and deformed, and his constitution weakly-prevented his being at any time sent from home for very long for the purpose of education. Ho was, however, carofully, taught, especially by a priest in Hampshire, under whose care he was for some time.

Popch, poetical faculty showed 'stael' at 'an unusually carty age, own from his very childhood, "I lisped in numbers, for the numbers cume," he himself tells. The ode on '8 Solitade "was written when its anthor was a boy of two'by; the 'Pactorial' only two years, later; and these were followed fin rapid and unbroken succession by other works of greater or less functions. He programs of the programs of the greater or less functions. He was a superior to the protein reputation was completely established by his "Essay on Critician," published in 1711.

About this same period Pope began to be much in London, and to cultivate the society of the leading men of letters, frequenting for this purpose the coffee-houses at which the wits were wont to meet: and by the impression which his great powers thus made on those best able to estimate them, senreely less than by his published works, be gradually attained the extraordinary and commanding position in the world of letters which he held until his death. His society was cultivated and his friendship sought by all who pretended to literary power themselves, or had judgment enough to appreciate it in mother. Bolingbroke, the brilliant and versatile statesman and daring free-thinker, and Warburton. the learned and ingenious divine, were equally his friends. He was the chief and centre of a literary clique of which Swift, Atterbury, Gay, and a number of others whose names are scarcely less known, were among the members.

In 1717, his father's death having left him with a considerable inheritance, which, added to the profits of his own works, was amply sufficient to maintain him in ease and comfort, he removed to Twokenhum, to the villa which his name rendered famous. Here he was able to indulge to the full his somewhat artificial tastes in gardening and decontion, and to enjor at will the society of his many friends.

. The diligence of Pope as a writer was very great; indeed, when we remember the extreme delicacy of his health (for his delicacy lasted all through life). it becomes amazing. The first part of "Windsor Forest," a descriptive poem in which Pope dwells with affectionate recollection apon the scenes amid which his childhood was passed, and the "Temple of Fame," a modernised imitation of Chancer's "House of Fame," were undoubtedly very early works. So was, probably, the "Elegy to the Memory of an Unfortunate Lady." These productions were soon followed by the "Rape of the Lock," the second part of "Windsor Forest," and the beautiful "Epistle of Eloisa to Abelard." Immediately afterwards Pope undertook the great task of translating Homer into English verse, and at intervals from 1715 to 1720 the translation of the "Iliad" appeared. The "Odyssey," so much of it at least as is the work of Pope, very soon followed. His next important work was the "Duncind," which in its first form appeared in 1728. For some years after this time Pope's poetical powers were devoted chiefly to a class of essays in verse, sometimes purely didactic, sometimes mainly satirical; the "Essay on Man" being of the former class, the "Moral Essays" of the latter. The last of his great poetical works, the "Dunciad," in its second and much altered form, appeared in 1742. Nor is this by any means a complete enumeration of Pope's poetical works. We have made no mention of a large number of short but by no means unimportant pieces; nor, with the exception of Homer, have we spoken of his numerous translations from the classical writers, or of his adaptations of the older English poets. And his poems are not his only works; he wrote much in prose, especially in the series of papers written by him in conjunction with Swift and Atterbury, and published under the name of Martinus Scriblerus. His correspondence was very voluminous, and has been published.

Pope died, in 1744, at the villa at Twickenham in which he had resided for so many years.

The first class of 'Pope's works which we shall consider, though by no means the earliest in point of time, are his moral or 'didactic poems; and of these the most important is the famous "Bessy on Man.". The "Essay on Man." comprised in four episties addressed to Bolingbroke, was, as its author tells us, intended as an introduction to some pieces, on "Life and Manners" which he intended to write.

and of which the "Moral Essays" doubtless form a part. "I thought it more satisfactory to begin with considering man in the abstract, his nature and his state: since, to prove any moral duty, or enforce any moral precept, or to examine the perfection or imperfection of any creature whatsoever, it is necessary first to know what condition and relation it is placed in, and what is the proper end and purpose of its being." Accordingly, in the four epistles which make up the essay, Pope considers first "The nature and state of man with respect tothe universe"; secondly, "The nature and state of man with respect to bimself as an individual": thirdly, "The nature and state of man with respect to society"; and fourthly, "The nature and state of man with respect to happiness." Under these various heads the poet seeks to expose and reprovethe error of those who complain of the condition of man in the world, and find fault with the dealings of Providence, by pointing out that we see only a portion of those dealings, and are therefore not in a position to judge of them; and by the aid of such reflections as these he seeks to promote contentment and resignation, and lay the basis of a system of moral duty. It must be admitted, however, thatas a philosophical treatise the "Essay on Man" is eminently unsatisfactory. It is neither original nor profound in thought; and it is very far from disposing of the difficulties and mysteries upon which it touches. But in language and style the essay is throughout perfect; and the admirable truth of its observations of human nature, and the marvellous beauty and eloquence of its illustrations of its qualities, render it a very great poem. To the same class of writings in many respects as

the "Essay on Man" belong those which we have next to consider-the "Moral Essays." But theso are not, like the "Essay on Man," philosophical treatises attempting to solve the great enigmas of the universe. They deal with human nature in detail-the diversities and eccentricities of character. They contain the most brilliant and life-like pictures of individual character, and show Pope's powers of satire in their highest perfection. The first epistle is on the "Knowledge and Character of Men." In it, after speaking at length of the inconsistencies and seeming incomprehensibility of mon's characters and conduct, he develops his favourite theory, that there is a key to be found to every character in the ruling passion; and he concludes with some most striking examples, both humorous and pathetic, of the "ruling passion strong in death." The second epistle, "On the Characters of Women," is equally brilliant. The third and fourth epistles. on the "Use of Riches," afford Pope an admirable opportunity for the use of his varied powers.

directness which excited his anger, and alienated for few; and with Pope Swift lived on terms of him from her for ever. She died soon after, evidently under the infloence of disappointed and wounded affection.

In 1713 Swift had been appointed to the Deanery of St. Patrick's Cathedral, Dublin; tho character of his writings, and the per-

socal enmity which his satire had in some justances excited, being an obstacle to that bigher promotion to an Euglish bishopric which he so ardently desired and so confidently expected. During his residence in Dublia as dean, Swift showed his great powers as a satirist and party-leader in their most conspicuous light, and became almost in n moment the idel of the Irish action. It had been determined by the Govornment to introduce a large quantity of a now copper coinage into Ireland; and an Eaglish manufacturer, named Wood, had obtained the contract for the production of the new coin. Wood's baifpeace were from the first regarded as a wrong and a fraud. But Swift took on the quarrel, and wrote his famous series of lotters known as "Drapler's Letters," from their heving been published unde the signature of "M. B. Drapler." Ti skill with which these letters were framed was consummate, and their effect extraordinery. The people of Doblin, fadood of all Ireland, were excited to freazy; the coinage had to be withdrawa; and though Swift was well known to be the author of the letters,

the Government did not dare to attack him, and proceedings which had been commenced against the printer were discreetly abandoned. Thu- did Swift "his wronged country's copper chains onbind "

But Swift's heart was never in Ireland. He was novor an Irlshman in real sympathy, and never loved to be thought one ie any sense at all. Lendon was the place to which his thoughts and wishes really turned; there he reigned supreme. He was courted by all the leading political men on both sides, and might have sold his services to either almost at-bis own price. In society his hitter and brilliant speech, and the dread of his powerful and somewhat on serupulous pen, secured him that power which probably he valued more than affection. In the literary world he could have no rivnis, except Pope and Addison. And Addison and Swift, though on opposite sides in politics, always treated one enoties at least with respect, a respect which Swift showed

close intimacy end genuine friendship.

Swift probably not only suffered throughout much of his life, but find even been conscious of a tendency to mental disorder; a tendency which may very



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probably be the true key to much of what is most trange and most painful in his very painful career.

He had foretold in bitterness of spirit that he woold

"die at top first." And so it was. Disease of the brain began to show itself in him in about 1741; nud for the last four years of his life he was reduced to a state of absolute idiotcy, in which he died in 1745. He was buried in St. Patrick's Cathedral. By a stronge freak of feeling, showing olske what the end he anticipated was, and bow eddly that anticipation worked upon his mind, he left the bulk of his fortune to found an asylom for the instant in the city of Dublin, which still exists there under the of Swift's Hospital.

To examine Swift's works with anything like tho completeness which they deserve would demand for more space than we can passibly give to them in these lessons. His poems are numerous, chiefly ere team d'emrit-occasional verses on the most trivial subjects. It is impossible that such a mao The most important work of pure satire which Pope produced is the "Duncind," a sort of mockherois poem in which the glory and triumph of Dulness, the election of the King of the Dunces. and the solemnities on the occasion are related with the utmost suriousness, and with extreme humour,



ALEXANDER POPE

sometimes mixed with a good deal of coarseness both of idea and uxpression. The plan of the poem was, no doubt, in part suggested by Dryden's satire of "MacFleeknee," though the two works have very little in common. 'The first book of the "Dunelad" opens with an excellent description of the Empire of Dulness, and then goes on to relate the election of a successor to the throne of Dulness, in place of Eusden, the City poet, intoly deceased. In the first edition of the "Danciad" Pope assigned the bad eminence to Theobald, a man who unquestionably merited the title of dall, nucl who had been one of the many autogoul-ts of Pope, and his rival as an oditor of Shakespeare. In the second votsion of the poem the whole drift of the satire is changed, and in place of Theobald we find as King of the Dunees Colley Clibber, a writer of plays ery popular in their day, and who, with all his faults, certainly by no menns deserved to be called dull.

In the second book, which is the most incenious the most humarous, and the most severe of the whole satire, the poet, in imitation of the games in which the ancient epic poets took so much pleasure, gives an inimitable description of the contests and trials of skill held in honour of the election of the monorch. In the third and fourth books we have

an account of various scenes at the Court of Dulness: and a wonderful picture in mock-heroic strains of the eradual extinction of Sense, Wit, and Learning. and of the power of Dulness enveloping the whole world. This satire gave Pope an opportunity of doing two things-first, of entering his genuine protest against and thoroughly exposing the bad tuste, useless learning, and misapplied ingennity which he saw around; and, secondly, of taking a signal revenge upon all those in the world of letters from whose attacks, provoked or unprovoked, he had buffered. Not one of them escapes; not one of them but is exhibited in a light equally ludicross and contemptible.

In its bright and sparkling humour, the most akin to the satires among Pope's poems is the delightful "Hape of the Lock"; indeed, in one sense, it might be called a satire. The occasion of the piece was the adventure of a young nobleman who pre-uned furthely to ent a lock of hair from the head of a fair lady. The incident led to an estrangement botween the two familles, and Pope is said to have written his poem with the benevulent Intention of bringing ab nt n reconcillation, an object in which

he succeiled.

It less already been said that Pope, like all the poets of the same school, is, for one so great as he was, defluient in the power of depicting passion ur moving our sympathies. The two most important poems, in which the interest is untilly founded upon the pathetic, are the "Elegy on the Death of an Unfortunate Lady," and the "Epistle of Eloisa to Abelard." The first of these is full of beauty and tenderness. But it discloses too little of the melan choly story to which it refure, and is tuo studied and regular to appeal very strongly to the feelings of the reader. The "Epistle of Eleisa to Abelard"

is of far higher power.

The poets of Queen Anne's day, as they were deficient in power over the emotions, were no less wanting in gousine appreciation of external auture. They are at home only in the city, in the club, among men and women living in a highly artificial state of culture. And this characteristic is very apparent in Pope's country poems, such as the "Pastomls and "Windsor Forest." No one can full to admire them for the beauty of their dienon and versification. Their ideas, too, are always appropriate. But they are unreal. They have nothing of the open alr about them, none of the true breath of the green field and the wood.

There remains one great work of Pope which we cannot leave unnot leed-his translation of Homer. Of all the poet's works this was the one from which he derived incomparably the largest pocuniary profit; and it probably contributed more than any and was the source of his ndvancement in life. He became secretary to the embarsy at the Hague, and olitimately rose 'to the simportant post of British Ambasador in Paris for King William III. and Queen Anne. Prior's poems are for the most part short lyrical pleese on occasional subjects. They are little read now; but they are light, easy, and graeful, showing much knowledge of mea and much lumour, though not without the taint of courseness.

There are very few poets whose reputation has so clearly illustrated the fluctuations in popular taste from age to age as that of Edward Young, 'He was born in 1681 and died in 1765, thus surviving for some years most of those of whom we have to speak in this lesson. And Indeed, except in the artificial character of his poems, he has not very much in common with the school of Pope. Young was a clergyman, though he seems to have taken orders rather in disappointment at his want of success in other employments than from any great devotion to the sacred calling. In the Church, too, he seems ever to have indulged hopes of success and advancemont which were never realised. He became a soured, disappointed, and discontented man, unbappy in himself, and not very mniable or attractive to those about him. His great work-the only one which is now much remembered-is the "Night Thoughts," a series of nine meditations on subjects whose solemn character is suited to the night, to which they are assigned. In these somewhat gloomy meditations we may well suppose that Young sought relief from his own vexation and hitteruces.

There are but a few more among the poets of this age who ought not to pass wholly unnoticed, though we can do little more than mention their names, Thomas Parnell was another of Pope's literary friends and followers. Ho was an Irishman by birth and education, and held a living in that country. The work by which he is best known is his poetical tale of "The Hermit." Sir Samuel Garth was a physician of eminence. He is known by his poem, "The Dispensary," a fairly successful example of that easiest of all forms of literature, the burlesque, Sir Richard Blackmore was likewise a physician in extensive practice. His works are enormously voluminous; epic after epic flowed from his pen, few of which were read at the time, and none of them now. He is remembered chiefly by Pope's satirie attacks upon him in the "Dunciad," The same may be said of Ambrose Philips, a writer of pastorals and other shorter pieces. His reputation was great during his life. His very name would probably hardly be remembered now, had not Pope given him immortality.

LOGIC. - V. (Continued from p. 281.) FALLACIES (continued).

We now come to the consideration of material or non-logical fallacies, as they are sometimes called.

The first of these is termed Ignoratic Menchi, because in it, instead of proving the contradictory of the proposition advanced by your opponent (which, in order to retute him usessently), you are bound to do, and which Artscolle calls Eneckur), you prove some other proposition which, by more or less resembling it, is likely to be mistaken for it. In doing this, some one or more of the roles given by Logic for proving the contradictory of n given promosition will be violated.

This is a fallacy which is very common in argument or controversy; and the particular manner in which the conclusion is irrelevant-i.e., fails to answer the purpose it is supposed to naswer-varies with each partioular case. Sometimes a particular will be proved when a universal is required; sometimes one with terms which are not the same in sense as those in the conclusion really given to be established. Suppose we are seeking to prove that a certain man was virtuous in his life and character (which makes it necessary to show that on the whole all his nets and deeds were virtuous), but we claim to have proved all that is required, when we show satisfactorily that some of his acts were of this character, leaving out of slout altogether many others of a very different aspect. This is an instance of Ignoratio Elenchi. So also if, when we ought to show a thing is just, instead of that we show that it is inexpedient, or vice versa; or, if the right of private judgment in matters of religion be maintained, we imagine this disproved by the statement, however true, that it is impossible for everyone to be right in his judgment, which in reality was never denied by our opponent. An instance of the employment of this fallacy through the instrumentality of an ambiguous term is often nfforded by those who, in theological controversy, establish certain conclusions in reference to "faith," used in one sense, and then use these conclusions to meet arguments in which the word is used in n different sense.

This is really the fallacy involved in the error of shifting ground, as well as in that of combating both the premises of an opponent alternately, instead of dealing with one only at a time, and having done with it before proceeding to another.

Persons often seem to think that it is quite sufficient to show that there exist grave objections against the adoption of a particular plan in order

other to establish his fame. Nor is this remarkable. Pope translated the "Biad" and one-half of the "Odyssey"; and his translation is undonbtedly a great poem. The actual sense of the original is

favourite with the great, but never received any public advancement; and "died unpensioned with a hundred friends," having for many years lived as a kind of favoured pensioner in the housebold of



throughout preserved with substantial accuracy; and the language and vorsification are faultless. And in Pope's days, while men's taste in poetry And in Popes cays, winto men's taste in pourty was what it then was, no one looked for anything more; a version which reproduced the old Greek bard more faithfully would not have been admired or appreciated. But, in truth, no great poot was ever so ill qualified to translate Homer as Pope, just as no generation of Englishmen were ever so ill qualified fulrly to estimate a translation of Homer as the generation among whom Pope lived. The finish, the antithetical acatness of Pope's diction, the even monotony of his verse, with its uniform rhyming couplets, are the very opposite of Homer's charac-teristics. The result is that, us was said by a contemporary critic, though the poem is a great poem, "it is not Homer." In tone, spirit, and ebaracter it is wholly unlike the original.

John Gny was one of the most eminent of the minor poets in the society which surrounded Pope and Swift. Witty, genial, kindly, and affectionate, he was not only popular with the public, but singu-larly beloved by his friends. He received more than one fortune, but always lost them; made much money by his works, but never kept it; was a

the Duke and Duchess of Queensberry. His most important works are a series of pastorsis published under the name of "The Shepherd's Week"; bis Fables; "Trivia," a burlesque or satire upon Lon rances; "Irivia," a barlesque or satire upon London life, and, above all, the Beggar's Opera. This last was the most successful plece that had ever been acted. It became the rage in a moment, is said to have for some time driven Italian opera from the stage, and is by no means forgotten yet. An nocomplished critic has truly said of Gay that in his ballads "there is n peculiar, hinted, pathetic sweetness and melody. It charms and melts you. It is indefinable, but it exists; and is the property of John Gay's and Oliver Goldsmith's best verse, as fragrance is of a violet, or freshness of a rose.

A very different career was that of Matthew Prior. He was of very humble origin, being the son of a vintner in Whitehall : and we find him in his afterdays of prosperity and distinction often reproached with his ignoble birth. His first literary effort was "The Town and Country Mouse"-of which be wrote the greater part—a burlesque poem intended to ridicule Drydon's "Hind and the Panther." This brought him to the knowledge of influential men,

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to force others to reject it. This is in reality the fallney of Ignoratio Elenchi; it is proving that there are weighty objections against a particular course, when what is required to be proved is that there are more weighty and insuperable objections against its adoption than against its rejection.

ould be borne in mind that those who employ It should be norms in mind that these was company this fallacy very frequently suppress the conclusion they are really proving, in order that it may thus escape notice that they are not really proving the one required ; and, as Archbishop Whately rethis is, "purhaps, the most common form of that confusion of thought to which those are liable who have been irregularly and unskilfully educated— who have collected perhaps a considerable amount of knowledge, without arrangement, and without oultivotion of logical limbits. Most of the erroneous riows in morals, and in other subjects, which prevail among such persons, may be exhibited in the vall among such passons, may be exhibited in the form of fallestes of irrelevant oscolastics: e.g., the posetion whether it be inhumble for no Circuits and outliness of the control of the control of the control control, and, "whether a Christian magistratum may employ physical occretion, and inflict secolar punishment on will-doern,"—those are prepatally confounded with the questions "whether Christians are allowed to fight as such—fa., to fight for their religion against those who corrept or reject the

religion against those who corrupt or reject the faith'; and "whether a Christian magistrate may employ coercion on behalf of Christianity, and inflict punishment on berettes os evil-doors."

The fallacy called Pattic Principit (begging the question) is used whenever that is assumed as question) is used whenever that is assumed as granted which englit to have been proved. This is the account ordinarily given, nithough Archbishop Whately confines the name to those coses in which one of the premises is plainly the same as the conclusion, or is proved from it, or is such as the person to whom the argument is addressed would not know or admlt, except as an argument from the con-clusion: e.g., where one argues in favour of the authenticity of a history from its recording clusion: e.g., where one argues in favour of the authenticity of a history from its recording certain facts which rest themselves for their reality morely on the cridence of the same history. The form in which this fallacy most commonly occurs is in that which has been called "arguing in

a circle "—a species of argument in which the ultimate conclusion is proved by n train of reasoning, which has one of its premises the same as this conelusion: 44., "Some mathematicians," according to Whately, "attempt to prove that every particle of matter gravitates equally. 'Why?' 'Because those bodies which contain more particles ever gravitate more strongly, i.e., are heavier.' 'But (it may be urged) those which are heaviest are not nlways most bulky,' 'No, but still they contain

more particles, though mure clusely condensed.

'How do you know that?' Because they are heavier.' How does that prove it?' Because all particles of matter gravitating equally, that mass which is specifically the heavier unst needs bave the more of them in the same space." It should be observed that the longer the chain of

reasoning-i.e., the wider the circle—the more likely it is that the fallsoy will escape observation. it is that the fallsoy will escape observation. The fallsoy of "new censes pre couse" (literally, "taking as the cause that which is not used ") is divided into two kinds, called respectively " now rerai pre cent " ned "as see late pre tail," which is reality ore—the formor, arguing from a false prender as if it were true (i.e., heaving, in legical language, as if it were true (i.e., heaving, in legical language, the expressed premise false), and the latter arguing from a case not parallel or similar, as if it were (6.c., having the sequenced premise false). In the one onse there is so connection at all between the effect and the cause to which it is ottibuted; in the other, if there is any such coun ction at all, it is an

insufficient one

Instances of the fallacy of " non cause pro cause" are very common, especially among the unconcated and vulgar, who are very liable to suppose, from seeing two events often or even semetimes conjuined. that there subsists some necessary connection between thom, that the one must be the cause of between thom, that the one must be the cause of the other. Most instances of popular superatition may, necordingly, be referred to this source. In this way it used to be generally thought that the appearance of a count pot tended some great national calamity, mosely because it so happened that on several occasions when comets were visible great disasters occurred in some portion of the world. Not that this erroneous mode of reasoning is one from which the educated and scientific can supposed free. Most writers upon political economy in the last century (antil Adam Smith) thought that money, in place of being murely a sign, was the cause of wealth in a country, and honce tried to restrict its flowing out in the natural course of to restrict its nowing out in toe natural course in trude; and no error is more common in politics than to attribute the state of trale to the political character of the Ministry without making any attempt to show the connection. An instance not announmently given of "a non talk pre tall" is this: "What intoxicates should be forbidden; wine intoxicates; therefore wine should be forbidden": here the minor promise only being trae of wine taken in excus, is in the conclusion treated as if it were true of wine taken in any quantity. This might also be exhibited us a fallacy "a dieto secundum anid ad dictum simplicitor."

We have thus given a brief and incomplete out-line of the kinds of fallacies must usually met with

in argument with others, or most liable to deceive us in solitary reasoning; and we shell now illustrate the remarks made by some examples of the most celebrated fellacies on which the ancient

logicians used to exercise their ingennity. Perhaps the most calebrated of all is that of "Achillos and the Tortoise." It runs tims .- "Supposo Achilles to run ten times faster than the tortoise : and while he remains in his place let the tortoise stort and run through n certain portion (say n tenth) of the entire space to be traversed. Let Achilles thea start to evertake the tertelse; he can never overlake it; for, while he rans through the teeth part of the coerso by which the tortoke had the start of him, the tortoise will have run further through a tenth of a space equivalent to that—i c , through \(\tau_0^2 \text{b}_0^2 \text{b} \) part of the whole—and when Abhilles has get through this, the terteire will have get ou in advance through 1sth part of this, i.e., through Tobsth part of the whole, and so on for over; so that Achilles will never be able to overtake the tortobe. though he runs ten times as fast." The solution of this fallney by Diogenes (Solritur ambulanda) i.e., that it is false-is berdly a satisfactory logical mode of excaping from the difficulty. No one ever doubted that. Nor is it much more satisfactory to allow, as Archbishop Wisately does, that it enupossibly be exhibited in a syllogistic form at all. which would virtuelly be a surrender of the proposition that the syllogism is a test by which we reasonleg. Mansel's is the best solution, which olosses the fallacy as a material one. Let the whole age to be traversed be represented by A, and then the syllogism representing the reasoning will be this: "Any space equal to $\hat{\gamma}_0 + \hat{\gamma}_{00} + \hat{\gamma}_{00}$, oto, is infinite (being the sum of an infinite series). The space to be passed before Achilles overtakes the rtoise is equal to that sum: therefore it is infinite." In this the major premise is simply false. The sum of an infinite series is not necessarily infinite; it may be, and in this case is, finite. And this solves the whole mystery.

There was a rather selectrated fallacy which seemingly proved that motion was impossible.

"Whatever body moved must more either in the place when it is, or in the place where it is not; place when it is, or in the place where it is not; move at all." The true solution of this sophism, as pointed out by Hobber and Dean Mannel, in, that the major precises is false. It is not true that a hosty place where it is not; for it may, as it does, more partly in the one and partly in the other; and the fallacy thus lies, not in the form, but in the matter.

One more example of these ingenious puzzles may

be given: "He who is most hungry outs most; hewho cante feast is most hungry; therefore he who eats least casts most." The true solution of this manifestly is that there no in the supposed sytlogism more than three fenus, inasmuch as what is really meant is, "He who is most langry will set most; he who has cates least is most hungry; therefore, he who has cates least will ast most;

. ...

It would not, however, be suitable to dwell longer upon such fallacies us these, which were usually looked on rather as musing exercises for the ingenious than as leading to any usoful result.

genious than as leading to may useful recult, analogative of words by perfuse, the mast frastist analogative of words by perfuse, the mast frastist senere of analogated fallows in reasoning, whether are constantly medium to first recurse within, thinging apparently identical, are restly different, and are rare constantly medium to first recurse within, thinging apparently identical, are restly different, and are valid interested as a like of words of the first and with literations of their output different and the within literation of their output different and the valid perfusions. A lite of words of this kind, with literation of their output and the perfusion to Lords ** run dash in its right could pain a literature on Lords ** run dash in its right could be a literature and the second of the second of the second of the second pine of words whose different senses are likely to a literature of the second of the second of the second of ** Impossibility** ("exit his kindered words) is need

with three different and distinct mennings. '1. It is

employed to denote mathematical impossibility. Anything is so called which involves an almardity or a contradiction, this name being given from the fact that the greater number of Instances of It occur In the mathematical scionees: e.g., that two straight lines should enclose a space is a mathematical apossibility. It is absurd, inconceivable, and a contradiction in terms, being at varionce with the very definition of a straight line. It amounts, in fact, to this, that the same line should be straight and not straight at the same time. 2. A physical Impossibility is something at variance with the existing laws of nature, and which cannot take place while those laws remain as they are: eg., that a man should be able to live under water, or that a feather and a stone should full to the ground in the same space of time. There is not here, as in a mathematical Impossibility, any inconcerability implied. We can quite readily conceive the existing lnws of nature altered so that a man should have the power of living under water, and a feather and a stone have the same weight (i.e., be attracted with equal power towards the earth). There is no contradiction involved in imagining this to be so; and we, in fact, know that, whenever a wirnele has been performed, such a suspension or violation of the

which makes the individual differ from other individuals of the source class (whether genus or species), and only embraces all those common features which are to be found in all the individuals of the class, i.e., in all those to which the universal term can be applied: 2.g., "II I out the mention and the consideration of every circumstance which ultilunguistics a Zhim from any where mentains. I then the applied is a proper in the consideration of the contraction of t

Having now shortly gone through the different rules of ladge and seen its penetical application, amongst other things, in the detection of erronces reasoning; and having, we loope successfully, shown that the study is neither so uninteresting or as necless at is frequently reserted, it is necessary, to make our outline complect, to give a held-shootly of the history of Lagic dawn to the pre-ent day, that he progressive development may be before seen.

The scheme, us we have It, cames from Green, though parts of I have been developed independently in India and China. It was the failards and quibilities of certain of the "Sophits", or popular tenchers of relateries and argumentation in Greece, that first stimular! Indical linguity. Zene the Electric, by his uncerious produces—the most electrical of which, arbilles and the totolose, has been referred to could have in the same could

Socrates, according to Aristotle, was the first to give an account of induction and definition. But the Socratic induction was, in appearance, little more than a very imperfect induction by simple enmoration It involved the assumption (never explicitly made by Socrates himself, but developed by Plato in his theory of Ideas) that the reason the instances taken are fair samples of the class to which they belong is, that cacle possesses the "essence" -that is, some attributes not merely similar in all the members, but notually common to then, and the foundation of their properties. This was developed by Plato in his theory of Ideas. The definition stated these "essential attributes," Thus, "Statesman" would be defined, after examining a number of examples, by stating those common attributes on which the rest were found to depend.

Plato developed this view in his theory of Ideas, which related, however, to things in themselves rather than to thought, and described elaborately division by directomy. The formula "Division should take place by real kinds" comes from him, and he is the true founder of the "Realism" familiar in the Middle Ages. In Book VI, of his "Republic" there is a striking conception of a system of the sciences—all of which are to be deduced from some single principle, and their affinity shown by the application of a kind of induction to their primary nations. But logical inquiry with Plato is only incidental to metaphysical.

But Aristotic is to be considered the first writer who attempted to treat logical questions by them-selves and upon a systematic plan, although many of the ashipets which (at least as. his works have came down to n-) he included within its limit would use the constant of the plane in a logical tratile at the present day. Still most of the essential elements of pure Logic are to be found contained in the series of treaties by him called the "Organon." The analysis of the explosion in particular is almost as a superior and the explosion in particular is almost analysis of the explosion in pa

wholly alne to him. Those who bestowed any attention upon the study in the period immediately after that of Aristotle med not be noticed. The Stoles, Indeed, are said to have invented the name of Logic, and also the threefold division of philosophy into logic, physics, and othics. Nor is it necessary to dwell mon the writings of Alexander of Aphrodisias and the other Greek commentators on the works of Aristotle who thursdayd from the second and third contarior of the Christian era down to the end of the sixth. One of them, Portdyry, was the author of the fivefold classification of the predicables into grans. species, difference, property, and accident, already mentioned, and a passage in a logical treatise by him perhaps belied to suggest the controversy of Nominalists and Rentists.

Basthins, who lived in the sixth century, is the only Latin communitare upon Aristatle deserving of the name; and his works form the connecting link between the Greek writers upon Logic and the Sphodmen of later times.

The famous scholastic philosophy, including the periods of its infancy, progress, and decline, extended from the eleventh to the close of the sixteenth contury. No doubt, in Logic, as in the other arts and sciences of which they pursued the study, the Schoolmen were too foud of over-subtle and refined homiries; and mon this arcount they have been frequently treated with a contempt little merited by the ability or research which they devoted to almost every branch of learning with which the world was then acquainted; and with which they started subjerts which the discoveries of later days have often embled their successors successfully to investigate and follow up. Perhaps their chief service to the study of Logic was in fixing what may be called its terminology. They determined with a greater precision than had previously been exhibited the technical terms of the science, although they often

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laws of nature has been brought about by the power of the Supreme Being. We cannot, however, surmount these laws, and so they impose restrictions upon us which it is a physical impossibility for us to overcome. Persons bave been often led into error in reasoning through not keeping these two senses of the word distinct. 3. The word "impossibility" is used to denote that strong degree of certainty which leaves no room for doubt upon the mind: We may be convinced that a certain event will never occur, even though it does not involve either a contradiction or a violation of any of the known laws of nature. Such an event is termed a secret impossibility. A good instance occurs in throwing dice. It is a moral impossibility that we should throw sixes a hundred times spocesslvely. We are certain, from our experience and reason, that such a contingency will not occur, although its occurrence is undoubtedly neither a mathematical nor a physical impossibility. So also it would be said to be morally impossible for all the inlabitants of England to be perfectly free from the commission of crime, although it is within the passe of every individual inhabitant to refrain from any ainal act. We know, however, that while the world remnins as it is, such a state of things will

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be out of place to give a brief account of what is involved in the famous controversy between the Nominalists and Realists which was waged so furiously in the Middle Ages.

The question which gave birth to so many different schools of thought might be treated in various ways. Perhaps the shortest statement that could be given of it is this-What is the object of our thoughts when we make use of general or universal terms! There is no difficulty, so long as we use a singular term, one which relates only to a single findlyidual: e.g., "Peter," "Julies Cremr," "this tree," "this mountain." Here the object of which we are thinking, and which is present to our mind can be nothing else than the one individual for which the name stands. When, however, we make use of the corresponding general or universal terms, "man," " conqueror," "tree," " mountain," the case is different. Here we cannot accurately specify the object of our thoughts with the same facility as ore. We have no longer a term which is applicable to one object and one only; but one which is applicable to an indefinite number of objects—to as many, in fact, as the generic or universal term stands for. What, then, is the actual object of thought present to our minds when we use such a term? This was the subject of controversy; and

various were the nawers given to the question.

Those called the Realster maintained that there was a really existing thing corresponding to the universal terms, "man," "conquere," "monorthat," singular terms, "Peter," "lifting terms, "Rims," et al. This really existing thing was not the same at that denoted by the name (for hatines) of an in-dividual monorthat, e.g., Eliza, or else the term weeth universal was applicable to the individual; this thing (whethere it is not same) mass call it is the individual, where the content was the content of the conten

although distinct from it.

The Nominalists held, on the other hand, that it is the mere term or sesse of which we think when we employ a general or universal term. It is the seerd "mountain" or "tree" which is present to our thoughts, and not any thing, whether universal or particular.

Various intermediata views between these two cutranes were advanced by different thinkers from time to time, which it is very eften extremely difficult to distinguish one from another, and which it is nanoesewary to emmente here. Archibalop Whataly's view, however, may be mentioned. Adoording to bim, the notion expressed by a mirvessal term is merely an incomplex of mindepute notion of an individual. The complex idea represented by the universal term is merecular-monitor very sicumentance.

material. So also it is with judging and reasoning. Whenever the judgment or conclusion can be formed by the mind with the data originally given, and without the necessity of having recourse to the aid of experience, the process is formal; if otherwise, material.

. Those, then, who regard Logic as the science of the laws of formal thinking, regard-its province (considering it as a pure theoretical seience, and not as applicable to other seignees) in each of these eases as being concerned only with what is formal. and as giving rules by which it can be accurately determined whether any of the laws of thought (which we cannot here discuss) have been in the process trangressed or not. That which is material. whether in the process or product of thinking, is in this view entirely outside its province. Whatever view we take on this latter question, the study of the form of thought apart from the matter is now so far developed that it has become possible to treat it by the aid of symbols, after the manner of algebra. This, however, is too large a subject to be dealt with here. The student who wishes to pursuo this branch of the study may be referred to Venn's "Symbolic Logic,"

We cannot better conclude these papers upon Logic than by quoting some remarks of Archbishop Thomson, in his "Laws of Thought":-"Tho attempt to apply the rules of Logic will both raiso and lower the opinion which obtains concerning the worth of the science. Those who condemn it altogether, as arbitrary and artificial, as a set of rules for arguing, put together in an age when truth was less the object of desire than argument, may find to their surprise that it is only a searching and systematic account of processes which they daily perform, whether in thought or in argument, in the pursuit of a science or in the transactions of the street and market. Those, on the other hand, who expect that Logic will be to them a golden key to unlock the treasure-house of the knowledge of the universe, will find that it neither gives them, nor pretends to give, any new power; that it only refines and strengthens powers they already possess; that out of a dunce it never yet made a philosopher. Whilst its rules apply to every science, and it may therefore lay some claim to its ancient title-the Art of Arts, the Instrument of Instruments-it only assists us in the study of the sciences, not stands in their stead. We must fight our own way over every inch of ground in the field; but Logic will often prevent our throwing away our blows. . . . We only affirm that when men think, these are the rules according to which their thoughts run; that the knowledge of laws and principles, independent of ulterior profit, is always gratifying to active minds;

and that, inasmuoh as the clear understanding of what is right is always useful for the avoidance of what is it always useful for the avoidance of what is wrong, Logic is a useful instrument, in thinking. But it gives us the forms of knowledge, not the matter. It will not lay bare the hidden springs of moral nation, nor explain the mystem of life, of sleep, of fancy, of memory; nor display the fature destination of man in the world."

METEOROLOGY.—V. [Continued from p. 288.]

THE MOISTURE OF THE ATMOSPHERE.

THE water-vapour in the atmosphere varies in amount in different times and seasons. It varies with the temperature and assesses, it varies with the temperature and preserves and excesses. It varies with the neighbourhood of bodies of water. Its one source is evaporation. The volume of a gas alters with changes of temperature and pressure, and a vapour differs in this respect mainly in the fact that with a moderate increase in the pressure or a slight fall of temperature, it will pass partly into a lugded or a solid form. A given mass of all at any particular temperature and pressure con only hold a certain quantity of water in



Fig. 14,-LAMONT'S ATMOMETER.

form of vapour. Lowering the temperature, increasing the pressure, or attempting to introduce more water-vapour, will cause some of the vapour to condense into the liquid or the solid state. On the other hand, if air be not saturated, if, that is, LOGIO. 327

curried to an extrame and vectorison degree or minimeness their datametica's between the various uses and eignification of the second of their subsection of the mature and office of Logic state conception of the nature and office of Logic than Artistate bad done; and its way with them that the famous controversy between the Nominalities and Realities, obove referred to, was begun and mainly carried on. This, bowever, belonged in strictness to Metahyayios rather than to Logic

From the time of the Schoolmen down to that of Kant, many names of more or less note occur; amongst which may be mentioned Bacon, Hobbes, endl, Descartes, Laibnitz, and Wolf. Bacon, indeed, ridiculed the Deductive Logic of the schools as useless for research; but he formulated n method of Induction which, though unworkable in itself, contained striking anticipations of modern scientific methods, and suggested much of what J. S. Mill wrote on Induction. The famous German philosopher, Kant, has, however, done more for the science of Logio than ony other writer from the days of Aristotle to our own time. Ho defined it, in his elebrated work called the "Critique of the Pure Reasoo," as "the science of the necessary laws of thought," and thus introduced a useful distin between the matter and form of thought, upon which we shall make one or two remarks presently.

Of late years there has been a considerable re-

Of late years there has been a considerable riving in logical study, especially in Germany; and the great advences which have been made in the study of the mind will probably make it requisite to re-state some of the elementary definitions of the costone. The name of Signort, Lotza, and Wundt may be mentioned in this connection; but in an of their work, but in the connection is the in and of their work.

Logic has usually been popularly treated in the anner in which it has been by Aldrich and Archhishop Whately, as conversant with reasoning alone, to the exclusion of the other operations of the mind; but the more correct and scientific notion of it would make it embrace the analysis and consideration of the inws of thought in general, and not merely of the laws of renconing in particular. This is the view of Sir W. Hamilton and Dean Mansei and it is one which of course makes no practical difference in the rules such as have been already given with reference to syllogistic reasoning, but merely exhibits, as well as these, laws which are applicable to all thought, no matter on what employed, and which no sound thinker is at liberty to transgress, just as no sound reasoner can transgress the laws stated as applicable to the syllogism.

. It will, then, be well, without entering into a deep metaphysical discussion, for which there is not space, to examine what are the different processes of thought to which the science of Logic is, according to these writers, to happlich. These are laid down as three—conception, judgment, and reasoning, of which the two latter processes have been already explained, and the first follows on simple approlession.

in the product resulting in our mind from any cord thiought, we may alway distinguish between, what is called the saction and what is called the substantial control of the interior to the control of the control of the interior to the control of the control of the interior to the control of the performs it; while the interior to the control of the performs it; while the interior to the control of the performs. Thus to consider the mind is given control antitudes which it combines by the cost of control antitudes which it combines by the cost of an object of intattion (i.e., to explain its popularity, consecution of the control of the control of control control control of control of control of control control co

ception of the given attributes of reason, life, etc.
By the not of judging, similarly, the concepts
by the not of judging, similarly, the concepts
who have given are thought as being reliated in some
namner to on object of thought (e.g., as agreeing
or disagreeing with h). Thus, when given the two
concepts of "man" and "mortal," the mind, by the
not of judging, foomnects them in the judgment,

"mon is mortal."
So also in reasoning, judgments are what are given to be combined by the set of the mind and thought as necessitating enotice judgment following from them as their consequence. Of this, after what has been previously said in treating of the syllogism, an example is unnecessary.

We thus have, in each of the three operations of thought, to distinguish carefully between the watter attributes, concepts, judgments—and the form conveyed in and by the act of the mind.

The present of thinking, too, any in such case to clither format or material. It is formal when no forther materials are necessary for compiting the notation materials are necessary for compiting the material when the contemp? the same and the mind is obliged to have recourse to some other torone material when the contemp? the same and the mind is obliged to have recourse to some other torone it can complete the precess. Suppose, the frantance, it can complete the precess. Suppose, the frantance, it can complete the precess. Suppose, the frantance, and also the thirt them as co-sisting together in an object, without having first to appeal to experience to have backers are jobels to setually in existence when the contemp of
weather is to be wet or fine; in the other, the cowl of the figure of a monk falls forward over his head or backwards on to his shoulders. An equally simple but far more useful instrument is the hair lygrometer of Saussure. It consists of a human hair, from which all grease is carefully removed, stretched, by a light weight, from a screw, the thread connecting the weight to the hair passing round the sheaf of a block which carries an index round a graduated arc. The instrument may be set by bringing it into air perfectly saturated with moisture, as indicated by the formation of cloud, and then tightening the screw till the index stands at 100 on the scale. The hair shortens as it dries. In cold climates this hygrometer which is truly quantitative in its action, giving the percentage of humidity, is used in preference to Mason's dry and wet bulb hygrometer (see lessons in Physical Geography, Vol. I., p. 209) on account of the trouble caused by the freezing of the latter instrument. . Mason's hygrometer, which is, however, much used, depends on the principle that evaporation lowers the temperature of neighbouring objects. The reason of this is that heat ("the latent heat of evaporation") is required to convert water into vapour, and is, therefore, withdrawn from neighbouring objects. Just, therefore, as we cool wine by wrapping a wet cloth round the bottle and putting it in the sun or before the fire, so, unless the air is saturated with moistnre, the wot-bulb thermometer always indicates a temperature lower than that shown by the dry bulb. When the air is saturated the two thermometers will read allke. and the difference between them increases with increased dryness of the air. The temperature of the dow-point may be obtained by multiplying tho difference between the temperatures of the wet and dry bulb by one of a series of numbers, known as Greenwich or Glaisher's factors, which vary with the temperature of the air at the time, and subtracting the product from the temperature of the air. The following are the factors :-

Dry-bulb				(Dry-bulb					
temperature F.*			actor.	temperature	Factor				
Below24			8.5	3485			26		
24 to 25	-		7:5	35-40			25		
25-26			6.4	4045			23		
26-27			6.3	4550			2.1		
2728			5-9	5065	•		2.0		
2829	~		5.7	5500		٠	1.8		
2930			5-0	60-65	-	٠	1.8		
3031			4.0	6570			17		
. 31-32			3.0	70-75			1.5		
32-33	-	-	81	7590	-	-	1.3		

From the dew-point we may calculate the rapour tension, or elastic force of the vapour present, often

eronicoulty called the absolute hamildity. By this we mean what height of precure by support present would rate at that temperature, or, what is the same thing, to what extent would varies against thing to what extent would varie-rapour at that temperature, if introduced into the Torricellian vacuum, depress the medeury below its height in the ordinarily vacuous barometer. This was calculated by Dulong, Arrigo, and Regnant it millimetres, as in the following table, though with us it is usually expressed in decimals of m inch is—

	mpen				ensions in		perat			Censious i			
(C	entig	må	٠,	11:	illimetres.	(Cer	(Centigrade).			millimetre			
	ő		٠.		4.60	1 .	60 -	٠.	٠.	148.79			
	. 5		٠.		6-53	ı	70 -		ď	233-00			
٠	10				9:17	ı	80 -			354.04			
	16				1270	1	90 -			525 45			
	20				17:39	١.	100 -		ď	760-00			
	30				81.55	١.	110 -			787'68			
	40				54'91		100 -			1520.00			
	60				91-98	l	160 -			4560 00			

We may also calcinize the relative himilatily, fraction of situation, or hypomorries tasks of the air, or ratio of this actual tension to the tension of vapour atturating the air at the same temperature. For crample, supposing the temperature of the air to be 15° C. and the deve-point 5° C., then the tension is 658 millimeters, while that of saturation would be 12°0 millimetres, or nearly twice as much, so that the ratio or hypometric state is 514.

From the vapour-tension we can also calculate, though it is usually found by tables, the weight of water in a onbic foot of air.

The relative hamldity may also, of course, be expressed as a percentage of saturation, taking complote saturation as 100, as in observations made by the hair-hygrometer.

Such facts as these are included in the daily reports of the Times for London and for Ben Nevis, the highest observatory in the British Isles. The following are the reports given on January 1st, 1892, of which day we have already given the barogram:—

TEMPERATURE AND HYGROMETRIC CONDITION OF THE AIR IN LONDON, (December 31— January 1.)

Hours of	Tempe	erature, ,	Tension	Weight of Va- pour in	Power of	(Satura-	
Obser- vation.	Air.	Dew- Point.	Vapour.		10 embie		
Noon	Deg. 50 47 48	Deg.	Inches.	Grains.	Grains.	Per cent	
9 p.m. 2 a.m.	47	.40 .39	*247 *288	36 29 28	.8	78 88	

54 deg.

BEN NEVIS OBSERVATORY, DEC. 31. SCHOOL STATION (4.465 ft, almost sea level).

	Bır.	Temperat.		We	nd.	Cloud.		
	At 321.	Dry Bulb.	Wet Bulb.	Direc-	Force. 0 to 6.	Species.	Amount O to 10.	
Sam. Spm.	ln. 254552 247871	Deg. 02-0 03-0	Sıt.	N. N.X.W.	0	Fog.	10 10	

Maymuna temperature, 210 deg.; minimuna temperature, 200 deg. El-cli bulb, —. Sundana, none. Ramfall, 6018 in. Baye Syxtox (42 ft, above sea level).

	Rır.	Temperat,		Wit	nd.	Cloud,		
	At 32".	Dry Bulb.	Wet Bulb.	Direc- lion	Farce 0 to 6.	Species.	Amount. 0 to 10.	
9 s.m.	ln. 20:150 20:421	Deg. 30'8 89'8	Deg. 35-6 37-7	Calm.	8	Stratus Nimbris.	10	

Maximum temperature, 42° dec. imbinatin temperature, 32° dec. illect bible, 63° Marshian, nithn. Infinifal, 07°250. Note; for the 21 here.—Baroneter Heige since 3 cm. Temperature shout steady at both stations. Lithic methodsceries or northerly winds, with fog mid heavy slowers of snow, or sammer. Light variable southerly at southwesterly mids, with cloudy sity and showers of rain, below. Depth of snow on summit, 30° and showers of rain, below.

As to hyctometry (from the Greek berds, hulles, rain) there is comparatively little we need add to what is stated in the lessons on Physical Geography (Vol. I., pp. 210-211).

Due is the precipitation of atmospheric mobiture in liquid form without the formation of etable cloud, Mara-frast is not fracta dew, being deposited directly in the solid form when the dew-point is below the freezing-point. Thus, gardeners finding the dew-point to be above 28° F. in the evening, need not fear the destructive action of hear-frost on their tender plants,

Whilst neither dew nor hon-frost are likely to be formed when there is wind, a most dangerous and destructive phenomenon known as regulas, or glateaf frast, is the direct result of wind. A slight thaw moistens the air, and a comparatively warm molt-wind passes over the still iteld ground, parting with its moisture as a sheet of ice deposited upon accepting. A slight shower may make material worse, as languaged in London more than once during the winter of 1891-29.

The proportion of cloud in the sky is stated—as seen in the Times' report—as ranging from 0, clear blue sky, to 10, a sky entirely overcast; but we may give here the table of letter symbols used on our charts, and known as Beaufort's realiter metation:—

b. Blue sky, whether with clear or lary atmosphere. c. Betached clouds. d. Britzburg rain. d. Britzburg rain. J. Lightung. n. Misty, lany atmosphere. d. Overcast, the whole sky covered with major vious cloud. n. Passing, temporary
shoners,
9 Squally,
r. Continued rain,
8, Snow,
f. Thunder,
H. Ugily, threatening
weather,
Visibity,

century show that the black spots seen on the surface of the sun vary in number and size, maxima recurring at intervals of about eleven years. The maxima and minima of sun-spots coincide very closely with the maximum and minimum numbers of auroras in successive years. The aurora borealis. or Northern Lights, is apparently an electric discharge around the magnetic poles of the earth. Less closely coincident eleven-year cycles have been traced in rainfall and droughts, good wine years and harvests, the number of shipwreeks, famines, and times of commercial speculation. erises, or panics. These phonomena can easily be shown to be dependent upon one another and thus indirectly upon the sun's action; but, though variations in this action may have a general effect upon the circulatory movements of our atmosphere. wenther depends upon the changes in the form of the isobar-, i.e., upon cyclones, anticyclones, etc. Though, therefore, sun-spots may affect the number and size of ovelenes, they can hardly determine their course, and can be of no use in forecasting the weather of any one locality.

Observations now extending over more than a

DRITISH COMMERCE.—VII.

(Continued from p. 255.)

WIND.

WIND arrives in casks or in bottles. The quantity received in 1897 in easks was 11,500,000 gallens, of the declared value of £3,100,000; the quantity in bottles, 3,000,000 gallons, of the declared value of £3,300,000. Thus, though the quantity received in casks exceeded by nearly five times the quantity received in bottles, its value was not half as much again as the value of the bottled wine. This, of course, is what one would naturally expect. The total import of wine, therefore, was 17,500,000 gallons, of the declared value of £6,400,000-about three millions storling in excess of the value of our coffee imports and one-ninth of the value of our imports of corn. These figures show that the wine trade is one of considerable magnitude, and it is apparently steadily increasing.

As to the countries contributing these supplies, the lead is taken by France, "the vineyard of the world." The amount from that country was 6,500,000 gallons, of the deckref value of £3,700,000. After France in quantity, though not in value, comes Spini with £100,000 gallons, of the deckred value of £800,000, white against Perugal's £300,000, gallons is set a value of £1,100,000. Other countries, in the order of the quantities sent by them, are Germany, £50,000 gallons, valued at £2£,000; Holland, 690,000 gallons, valued at £2£,000; Holland, 690,000 gallons, valued at £2£,000; indipance of £2,000; Australias in \$100,000 gallons, valued at £1,000; Madieria, \$150,000 gallons, valued at £1,000; and other countries, £37,000 gallons, valued at £7£,000.

These wines pass under tho general designations of red and white, sparkling and stall. The numerial of red vine imported (1897) In easks was 11,600,000 gallons, and of white wine 20,000,000, the respective values being £2,200,000 and £720,000; of red wine in beitles, of still wine, 60,000 gallons were imported, of sparkling 11,000, whined at £300,000 and £10,000; of white wine in beitles, of still wine, £300,000 gallons, were imported, of sparkling 2,000,000, whiled at £300,000 gallons, of sparkling 2,000,000, whiled at £300,000 gallons, of sparkling 2,000,000, whiled at £300,000 gallons of sparkling white wine, valued in £2,000,000.

For a general description of the process of winemaking, the following from Mr. Yeats's "Natural History of Commerce" will suffice:-"The grapes are gathered into baskets, which are emptied into a tnb, with holes at the bottom, called the wine-press. This tub is placed over unother much larger, named the wine-vat. A man then gets into the upper tab and presses or crushes the grapes by treading upon them, a mode of bruising the grape as ancient as wine-making itself. The juice or must, as it is termed, flows from the press into the vat, and sometimes within a few days, or even a few hours, depending on the temperature, begins to ferment, This fermentation makes the liquor turbid, increases its temperature and volume, so that it soon fills the vat. After a time the fermentation ceases, the liquor diminishes in temperature and lmlk, and becomes cool and clear. When quite cold it is drawn off, or racked, from the vat by a tap placed a few inches above the bottom, into an open vessel, whence it is conveyed into the cask prepared for its reception. After entering the cask, a second although much slighter fermentation takes place, which further clarifies the wine; its subsidence diminishes the bulk of the wine in the cask, and more wine is added, so as nearly to fill the cask. This again slightly renews the fermentation, and the cask is kent open until filled to its utmost capacity with wine free from fermentation; it is then closed and is ready for the market."

Among the wines of the world the leading position is assigned to champagne, which derives its name from the old province of Champagne where the art of making effervescing wines originated. This province is now represented by the departments of Marne, Haute-Marne, Aube, and Ardennes. The vintage takes place early in October, and comprises both red and white grapes. The delicate operations in the production of this wine commence with the bottling. The bottles are selected with great care, those with the least flaw in them being useless, as even great numbers of perfectly sound bottles burst during fermentation. After being bottled and the corks secured by a clip, the bottles are allowed to lie on their sides during the summer, and the sediment is thus deposited on the sides of the bottles, Removed next to cool cellars, the bottles are then placed in racks in a slanting position head downwards, and slightly shaken every day, to force the sediment on to the cork. This goes on for several weeks, when, the olins being removed from the corks, these come out and with them the sedlment. Tho wine is now liqueured to regulate the sweetness, and finally corked for the market.

It is this process of removing the sediment that makes it necessary for champagne bottles to have sloping shoulders: in ordinary bottles it is evident that the fall of the sediment to the cork would be interrupted by the sharp corners at the bottom of the neck. In efferveseing wines there are three grades: crémant, wine with a pressure on the bottle of less than four atmospheres; mousicur, a pressuro of from four to four and a half atmospheres : and arand mousseur, a pressure of five atmospheres. These different pressures are due to the presence of more or less earlionic neid. Chean champagnes - ve produced from ordinary wine, to which sugar and finvonring matter are added and then earbonic neid pumped in. The popular notion that sparious. champagne is made of gooseberry injec is circulous. It is not the material that champagne is made of that makes it dear-it is the skill, labour, and time. The grapes themselves are as cheap and plentiful as ever gooseberries are.

Though champagne maks so highly amongstwines. It is not by any mores is high-class natural wine. Distinction in this regard attaches peculiarly to the produce of the Médee district, on the banks of the Gironde. The Médoe wines are so highly perical that the produce of the different vineyrads are kept distinct, and only otherset related that conlated the second of the different vineyrads are kept distinct, and only otherset related that conlated the second of the control of the particular products of the particular growth and the particular year of their yield.

The Médoc vintage takes place towards the end of September, overlapping into the beginning of October. After gathering the grapes are conveyed

to the press-house, where they are freed from stalks and then thrown into vots. In about a fortnight. fermentation having set in the wine is drawn off into logsheads, which are then removed to airy stores. "The first month the bung is put lightly in, and the eask filled up every three or four days; the second month it is put in more firmly, and the cask filled every eight days. In March, the less having fallen, the first soutirage, or drawing-off, takes place. A second is made in June and a third in November. after which the horsheads are turned on their side and the filling our cease. In the second and following years, after the wine has been removed to dark cellars, two drawings-off suffice, one in spring and the other in autumn. After this, if the wine ferments, it is drawn off in a sulphwred cask, and, if necessary, fined with eggs and again drawn off in a fortnight." Such is the process of preparing the best clarets known to English consumers. The chief vintages of these wines during the present century are given as those of 1815, 1825, 1828, 1831. 1831, 1841, 1817, 1818, 1858, 1861, 1869, 1870, 1871, 1875, and 1885,

A well-known white wine from Médoe is Sauterne, so named from the district where it is grown, and which lies to the south of Bordenax. Here the vintage takes place towards the end of October. lapping over into November. The grapes, which are white, are gathered with great care and when they might be described as over-ripe and as having begun to ferment while still on the vine. They are not viitted as the other granes are, but immediately pressed and the fulce allowed to continue to ferment by itself. The finer classes of this wine, like the chateau bettled red wine of Médoc, are bottled previous to shipment, the earks being inscribed with the name of the chatem and the vintage. The finest growth of Santerne is Chiteau Youem, which is classed as a growth by itself and usually fetches a fourth more in price than the ordinary first growths. which vary considerably, reaching a figure as low as £8 a hogshead and as high as £60.

A favourite sparkling wine, the trade in which with England dates from 1874, comes from the produce of the vineyrads of Samura, a district in the department of Maluse-t-Lore. It is a good navi and the state of the

In the manufacture of sparkling Samuar half of "ench year's must is put in barrel- by itself to ferment and become wine, and is kept to be mixed with onehalf of the next year's must. In the following May the mixture is put into bottles to undergo its second fermentation, which is induced in the same manner as champagne, the wine being treated in precisely the same manner. The sediment is also worked into the neck in a similar manner, and is thrown off by the system of disgorgement." Natural conditions connected with its situation lend to Sanmur special ndvantages in producing sparkling wines. Behind it lies a range of hills which provide easy and firstclass cellarage. These bills are extensively excavated, and with no trouble thus afford storage of counble temperature.

After Médoc, in the matter of red wines, consess Bargundy, the district comparing the departments of Youne, Cóte-d'Or, and Saóne-et-Loire, and on the southern borders of Champagne, of Durgandy, the fine-t quality is produced in the communes of Natis and Reumen. In the department of Cóte-d'Or. Chablis is a commune of Youne, and yields a veill-hower white wine of the rame name. Another hower white wine of the rame name. Another from the produced of the produce

The departments of Charente and Charente-Inferieure, which are morth of the Gironde and ite on the Bay of Discay, produce the wine that brandy is distilled from. Though the natural wine is of inferior quality, like the natural wine of Champagne, yet it cannot be equalled for purposes.

After France, as a winc-producing country, may be placed Sprin, and among its produce of this commodity the first place is occupied by sherry, so mande from Jorze de la Fronten, the centre of the sherry-making industry. In France, the grower of the grapes generally makes the whire; in Sprin, however, it is different. Here the wine-maker purchases the first or the jetice from the grower, and converte it into the finished product. The best known unriety of sherry in this country is Amonthiber Springer, and the sheet in the sheet of th

From the adjacent country of Portigal comes the other familiar wine, port. It is produced in the district of Alto Douro in the north-crest, and derives its name from its port of shipment, via, Oppora-¿The galdering of the grapes commences towards the one of September, and is done mainly by women and children. After the stalks have been removed, the grapes are empited into stone tanks and than trodden upon by men and women to express the juice. The whole is left in the tanks to ferment, and, after fermentation, the must is drawn off into vats of the capacity of between 20 and 30 pipes each, and has alcohol added to it. "The wines are left untouched in the vats till the cold weather causes them to deposit the lees, when they are racked, and at the same time another small addition of brandy is made. The brandy used is, with hardly any exception. simply distilled winc, and is of very fine quality. About March or April the wines are again racked from their less into easks, and are sent down either by bont or rail to Oporto, where they are stored, in most cases for a considerable number of years, previous to being shipped. The oheaper wines are an exception, being as a rule shipped when young; also those of the so-called 'vintage' class, which are the finest wines of a good year kept separate and shipped as the produce of that particular year."

The beginning of the port wine trade, of which England is the leading market and in which it is mostly English capital that is employed, dates from the end of the seventeenth century. In its career it has experienced many ups and downs. For instance, about the inkidle of lost century it practically cellapsed through the extent to which the wine had been adulterated having made it lose favour. This gave rise to various restrictions being placed upon the trade, which in their turn gave rise to abuses, always inseparable from monopolies. Besides, the vinos have suffered severely from the ravages of diseases at different periods.

In Madeira the vintage commences in August, and the primitive method of treading the grapes with the naked feet obtains. The choicest and best known in this country of Madeira wines is Malmsey, distinguished in English history as a great invourite of one of our Norman Kings. Madeira is greatly improved by age, and it used to be enstomary for merchants to send it on a voyage to the Indies. This not only matured the wine but gave it a peculiar flavour, attributable to the high temperature of the ship's hold in which it was stored away. Now this end is gained by storing the wine in warehouses heated to a temperature of from 100 to 140 degrees Fahrenheit, according to the individual taste and character of the wine

Hock and Moselle are roughly the two classes into which German wines are thrown, and these again may be each either sparkling or still. Hock comes mainly from the districts traversed by the Rhine, and Moselle from the regions traversed by the river of that name. Of Hungarian wines the leading are Tokay and Carlowitz. Of Tokay there are three kinds, the first being made from the juice

that escapes from the grapes, after being put into casks to be pressed, without pressure, and so scarce as never to be seen in the market. Carlowitz is the produce of vineyards on the banks of the Danube. and partakes somewhat of the nature of port, though without the latter's fruitiness and softness. From Italy and Sicily, especially since the commercial rupture between Italy and France, come considerable consignments of wine. Formerly the Italian grape-growers used to sell their fruit to French wine-makers, and the produce of Italian vineyards was thus often sold as French wine. Italy having now lost that outlet for her enormous fruit yield, has had to turn greater attention to the making of the finished wine. These wines have consequently been very cheap recently, on account of their being in search of a market, so to speak. Of Sleilian wines the best is Marsala, which is prepared with great care, and so has acquired a reputation. Of our colonles, the Cape of Good Hope and Australia are doveloping a wine trade which, with Increased experience on the part of the colonists, may yet rival the trade of the European wine countries. It is too young yet to speak of on any point with certainty. The Cape wines are imitations of port and sherry: the Australian partaking of the nature of claret. and its white wines of the nature of the preduce of the Rhine vineyards. As to the Cape wines it is complained that they are often fortified with the nutive brandy-or "Cape smoke," as it is calledand this imparts an earthy flavour, which is an objection. BRANDY.

We have already mentioned in dealing with wines that brandy is made from the wines grown in the departments of Charente and Charente-Inférieure. where the grape is especially cultivated for this purpose. After the process of manufacture brandy ls stored in casks made of oak, from which it extracts part of the tannin, which imparts to it a light golden lme. It should be kept in well ventilated stores for at least two years, during which it loses in volume and in strength, but gains aroma and mellowness. The dark colour of brown brandy is given by caramel. Great quantities of the brandy sold are simply grain whisky or beet-root spirit, coloured and flavoured.

Though the best brandy thus comes from France, considerable quantities are yet sent by other countries-notably by Spain, Germany, and Holland. Our total imports amounted to 3,000,000 gallons, of the declared value of £1,300,000, in the year 1897. Of other spirits we imported in the same year, of rum 4,900,000 gallons, valued at £320,000, and of other sorts 1,800,000 gallons, valued at £815.000.

GREEK.

GREEK .- XXIV.

CONJUNCTIONS.

The following is a list of the chief conjunctions:—

καί, τε, and.

τι, that.

τι, or.

45, σστε, so as, so that.

core, μήτε, οὐδε, μηδέ, nor. Tea, in order that. άλλά, δε, but. Tea μή, in order that not, μέντοι, however. lest.

καιτοι. yet. έπεί, because, since. δεσ., then δείντ, because, that. σείντ, τοίνω, therefore. γείν, τοίνω, therefore. έπειδή, since.

cl, &r, edv. if.
elre, or, whether.
el \(\mu \), unlose, if not.
el \(\mu \), unlose, in \(\mu \) if \(\mu \), \(\mu \) ere, not?
elfe, and if.

elfe, and if.

elfe \(\mu \), \(\mu \) ere, as, as if.

Of these conjunctions some are simple. as wal. **.
if others are compound, as obs (so and rs), wierse
(wie and rs), sairot (sea and rs), rolove (rea and rs),
wiers (& a and rs), die's (did des., neuter of bers),
polic (s, and obs), tends (deel and did), tends (tend.
't', and dis), braw (for and did), and others are two
separate word, as s is m', fre us.

There are other conjunctions, whether a single word, as twike, when, or several words united, as robjects (to., riph, rob), now then temposity (rob, rob), now then temposity (rob, rip, ob), wherefore, on that account; or, again, several words in a separate state, as ob phy add, however, while is the follow.

One or two others deserve notice, as are, seeing that, as being—for example, are eyabs ar, as being good (Latin utpute bonus); #ép, although—for exnumle, eyabs me, although good.

There are certain words employed as adverbs in the composition of which there is a conjunction for example, byhow's, evidently (that is, byho's derw br., it is evident that); where, nometimes—nade up of isi, for form, and for (in Intin est cuando).

INTERJECTIONS,

Fine-rections, as expressing almost inarticulately the passions and emotions of the mind, are also numerous in the language of the Greeks, who were a people of strong feelings. The principal inter-

2. O! (sign of the voca- ofat, woe!

tive &, O! expressing &, ah!
pain or surprise). al, ol, ib, alas! (Latin
fou, ah! alas! kel!)

ieū, chen! ho! εἶα, come! (Latin eia!)
φεϋ, ah! [papæ!) εἶγς, well done! (Latin
βάβαι, ah! oh! (Latin euge!)

jections are these:-

Some imperatives are used as interjections; for example, tye, φίρε, 10ι, come! (Lat. age!); ἀπάγε, begone! (Latin apage!).

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FORMATION OF WORDS, NOUNS AND ADJECTIVES.

Simple words may be divided into two classes, the primitive and the derivative. Primitive words are those which are formed from a stem by the affixing of a nominal or a verbal termination. Thus, Adyss is a primitive, it being formed by the addition of -ss to Asys. Also Afys is a primitive, inasmuch as you form it by adding se to Arys.

Derivative words are such as are derived or formed from primitive words. Thus, from egy in egys, beganning, and byge, I begin, comes dyages, an adjective formed by suffixing ener to the stem; egystes accordingly signifies that which yees back to the beginning, ancient.

Nouns are generally formed from either verbed or nominal stems by means of a termination. This termination may be termed a suffix or a formative. Thus, by means of the suffix α is $\lambda \phi_{per}$ formed from the verbal stom λe_T ; and $\lambda \phi_{per}$ is $\lambda \phi_{per}$ formed from δp_{XR} (nominative δp_{XR}) by the addition of the suffix a_R .

Suffixes serve the end of showing the different relations under which the fundamental idea appears. Let us take as an example woise (rasis), I make. By entiting off the person-ending we obtain as the stem rate. From west-, with the learthening of the state of the continuous into m, and the introduction of the suffix or formatice, we make these words:

ποιέω (ποιώ), ποιε-, ποιη-.

ποιητής, a poet; ποιήσις, poetry; ποίημα(τ), a poem.

Having taken a verbal stem, let us now take a nominal stem:—

nominai stem: βασιλεύ (βασιλεύς, a kiny). βασιλεύς, a king; βασίλεια, a quecn: βασιλεία, a kingdom; βασιλικός, kingly.

Substantives are formed by various suffixes, of which the following are the most important — The door, or the person concerned with some act,

is denoted by one of these terminations —

(1) -ευς: ας γραφεύς, α πτίζετ, from γράφω; γονεύς,

 -ευς: ας γραφεύς, α πτίζετ, from γράφω; γονεύς, α ματεπέ, from γίγνομαι.
 -τηρ, -τωρ, -της (masculine), -τειρα, -τρια, -τρις,

1-της, τωρ, -της (masculinc), -τειρα, τρια, τρια, τρια, τρια, του (feminic): as saris, deliverer (adrespa, fem.), from σάζει βάτωρ, α εγκαλιστ (βεν, α lin βαθ); ανείτη, α βιμής (φεν, α lin κρίω); ποιτητής, α ροεί (ποιε-, ιια lin ποιίω); ποίτητής, α ροεί του αλλητής, α βιλαιροβιογία (ναλερα, α lin αλλίω); αλλητής, α female flute-player (αλλε, α lin αλλίω); αλλητής, α female flute-player (αλλε, α lin αλλίω);

The doing is indicated by the following terminations:—

- (1) res., res., res. (from rep.). The nomes hereto belonging are all faminine, as: -sfores, evas-follog, rest, follow, follow, as the rest follow, rest, follow, follow, as the rest follow, reckys, countiered insection access, as in rest-requal); splits, handling, action (from sper, as in splaw); yfevens, begins (from year, as in splaw); yfevens, begins (from year, as in yfeypae); Socquefae, proving (from Socquefae, as in Socquefae).
- (2) -μος: as σπασμός, cramp, spasm (from σπα-, as in σπάω); δεσμός, chain (from δε-, as in δέω); όδυσμός, παίδικα (from οδυρ-, as in δδύρω).
- . The result of action is denoted by-
 - μα (neuter): as πρώγμα, a thing done (from πραγ., as in πρώσσω); βήμα, a thing spoken (from ρε., as in έρδ); γμήμα, a cut (from τευ. as in τέμνω).
 - (2) -or (nouter): as λάχος, a lot (from λαχ-, as in λαγχάνω, αστ. έλαχον); έδος, συεθου (from εθ-, as in είωθα); τέκος, a okild (from τεκ-, as in τίκτω, αστ. έτεκον).

The same suffix in derived words denotes the peculiar quality, as:-

βάρος, ποίght, adj. stem βαρό-, nominative βαρός. βάθος, depth ,, βαθό- ,, βαθός. μῆκος, length ,, μακρό- ,, μακρός.

The instrument or means of an action is denoted by -roe, nom. -roev. neuter (the Latin -frum) :--

έροτρον, a plough (from aρο-, as in àρδω; Lat. aratrum).

λύτρον, a ransom (from λυ-, as in λόω). δίδακτρον, a teacher's fee (διδαχ-, as in διδάσκω).

Loss definite is the meaning of the related feminine suffix -τρα, as:—ξύστρα (ξύω, I thave), a curry-count; δρχάστρα (δρχίσμα, I dance), a dancing-place, our orchestra; παλαίστρα (παλαίω, I verestle), a wreatling-place.

Place is signified by-

- τήριον, neuter (the Latin -torium): as ἀκροατήριον, α place for hearing (Lat. auditorium), from ἀκροα-, ns in ἀκροάομαι; δικαστήριον, α judgment-hall, from δικαδ-, as in δικάζω.
- (2) είον (neuter): as λογείον, α speaking-place, from λογο-, as in λόγος; κουρείον, α δανδετ's shop, from κουρευ-, as in κουρεύς; Νουσείον, α παρευπ, from Μοῦσα, as in Μοῦσα.

Substantives denoting quality are derived from adjective stems by means of the following suffixes:—

		NOMINATIVE.	ADJ. STEM.	NOWIN.
١.	-rns (f.),	ταχύτης, quickness.	ταχυ	ταχύς.
		reorns, youth.	1'60	reds.
	-tus.	isotrus, equality.	100	Toros.
2.	-συνη (f.)	δικαιοσύνη, justice.	δικαιο.	δίκαισς.

σωφροσύνη, εσινέ. σωφρον. σώφρων. 3. - ια (f.) 'σοφία, πίειθου. σοφο. σοφό. εὐδαιμονία, happinoss. εὐδαιμον. εὐδαίμων

The suffix -ta with the vowel of the adjective stem becomes -eta and -ota :--

αλήθεια (αληθε-ια), truth. αληθε(s), άληθής. εύνους.

Diminutives, or words denoting the quality in a less degree, are formed from nouns as siens by means of these suffixes:—

- (1)-iso (artice): as xmblen, a little child, stem was, nom. wai; kmblen, a little garden, stom nyres, nom. kfrav. Desidos the form -io there are those—namely, .idon, _apon, .idon (ubpon): as olichon, a little hance (abo); washdoon, a little child (wair): μελάβριος, a ditty (μέλος, α and, our welody).
- (2) -ισκος, -ισκη: as γεανίσκος, α youth, stem γεανία, nom. γεανίας; παιδίσκη, α little maidon, stem παιδ-, nom, παϊς.

Patronymics, or nouns denoting descent from a father (sars[s)—that is, an ancestor—are formed mostly by the suffix -5s; for the masculine, and merely -: for the feminine (3 being lost). This suffix is added immediately to the stem in -a; as—

HASCULINE. PEMININE. NOMINATIVE.

Bopedons. Bopeds. Bopeds, the north wind.

Alveidons. Alveias. Anass.

To consonantal stems the suffix is appended by means of the vowel: as Kerporidys (mase.), Kerporis (fem.), from Kérpori, Corons.

Stems in ev and o of the third declension also take the connecting vowel i, before which the v disappears:—

Πηλείδης, from Πηλεύς. Αητοίδης, from Αητώ.
The e of the second declension is replaced by ι:

s				
MARCULINE,	PEMENINE.			NOMENATES F
Τανταλίδης.	Tarrahis,	from	original	. Τάνταλος.
Κρονίδης.		.,	,,	Κρόνυς.

Only 10 (nom. -105) is changed into 16: 48—

MARCULINE. FULLINE. 0001/KATE 1.

Ocotudors. 0001/KATE 1.

Ocotudors. 1001/KATE 1.

Menorisdors. 1001/KATE 1.

Merofitor

A less frequent suffix for patronymics is -ww: as Koorium, son of Koores.

Gentilia, or nouns denoting the gene or race, the country or the tribe whence a person is sprung, have the unityes:

- (1) ev (nom. evs): as Meyapeés, from the nounstem Néyapo, nom. và Méyapo, Méyara; Eperpeic, from the noun-stom Eperpes, nom. Eperpia. Feminime gestilla end in -8 (nom. -1): as Meyapin, nom. Meyapin, a semani g' Méyara; Sacchieria, nom. Swedieris, a noman of Sally.
 - (2) -τα (nom. -της): as Teyedτης (Teyéa), λίγινήτης (Α΄γινη, 'Ηπειρώτης ('Ηπειρός), Σικέλιώτης (Σικέλία).

ADJECTIVES,

The most important suffixes for the formation of adjectives are these:—

- (7) « (nom. -a-) expresses in the most general way the idea involved in the noun from which the adjective comes: as objectors, herecally (from the noun objects, herew). Dy appending up you also form adjective from adjective as 'stems, as haydene, illeral, from Andrey-(Andelpen, Proc) also gentile adjectives from names of places—thus, from Mayre comes Madgares, and from Mayres comes
- (2) -se (nom. -we), which is generally appended to the stem by means of, and in words derived from verbal stems signifies fitness: as, from eye (6yee) comes âgudes, fit for poreratips. From noms as stems are formed adjectives which denote the posuliar quality of this nom: a Sanchude, Kingly (Banchady, a King).
- (4) -eos. -our indicate the stuff or substance of which a thing is made: as \$\lambda(\theta)\text{eps}, \text{stony}, from .
- λίθος, α stone; χρύσεος, χρυσοῦς, golden, from χρῦσος, gold
- (5) -εις (fcm. -εσσα, nout, -εν) denotes fulness: no xapless, full of grace or beauty (from xapts, grace, beauty); bheis, full of wood (from βλη, a wood or forest).

VERBS.

- -οω: as μισθόω. I hire (from μισθότ, mages, remard); χρυσόω, I gild (χρύσος, gold).
- αω: as τιμάω, I honour (τιμή, honour); alτιάομαι, I accuse (alτία, cause, blame).
- (3) -εω: πε άριθμέω, Ι πυπδον (άριθμός, πυπδον);
 εὐτυχέω, Ι am fortunate (εὐτυχῆς, fortunate).
 (4) -ενω: πε βασιλεύω, Ι απι α king (βασιλεύς, α
- ευω: as βασιλεύω, I am a king (βασιλεύε, a king); βουλεύω, I counsel (βουλή, counsel).

- (5) -ιζω: αε ελπίζω, Ι hope (ελπίς, hope): Έλληνίζω,
- I speak Greek ("Ελλην, a Greek). (6) -αζω: απ δικάζω. Ι judye (δίκη, justice) ; έργάζ-
- ομαι I labour (έργος, labour).

 (Τ) -civu: ας σημαίνω, I signify (σήμα, α sign);
 λευκαίνω. I πhiten (λευκός, white).
- (8) -ww: απ ἡδύνω, I sweeten (ἡδύς. sweet); λαμπρόνω, I adorn (λαμπρός, brilliant).

From the same noun as a stem may be derived several verbs, having different terminations and different meanings; thus, δουλο, δούλο, a slave; δουλόω. I caslare; δουλέω, I am a slare; πολεμο, πόλεμο, πατ; πολεμός and πολεμίζω, I carry on πατ; πολεμός is in hadilities.

Vertre may also be formed from verbs. There are true classes of verbs while set forth the idea conveyed by the primitive verb under dertain modifications. These are called frequentative, including, and desiderative. The frequentative are those verbs which denotes repetition of the act; the includive, and the control of the control of the control which denotes the present of the control of the man the desiderative are those which agrees a desire towards that which the primitive declares.

(1) Programterires—Prognantatives are formed partity from the unchanged storn by means of the terminations acts, sign, sign; spartly by the convexion of the stem revel into e with the terminations—e.e. of by the lengthening of o into e, the fermination—e.e. of by the lengthening of o into e, the fermination—see didded; for example, eventles, I fracts frequently (from evident, to greats); abrilgs, I ask often Jive (from airs, to add offer.) I be giften airs, to a did offer.

(3) Inchestices.—Inchestives are formed by the addition of the termination -ero: as µeticas, I am addition of drunkenness (from µebic», to use strong drink); 'phdrau, I become an adult (from †pha, to be an adult).

(3) Desideratives.— Desideratives are generally formed from the first future of the primitive verby, the addition of the termination of -use: any powerful, I desire to laugh (from young, to leading), wakequestie, I wish to be in rear (from wakeputh) to make sear). Desideratives are formed also to wake the constitution of the terminations -use and -use: as anaevate, which to many (from reas and the search of the search of the terminations of the terminations of the terminations are and -use: as anaevate, I while to many (from repair yet, a general); bearethe, I desire death (from search, edeth).

COMBINATION.

. Besides primitive and derivative words, the Greek language has compound words—i.e., words which are made up of two words or more, and are designed to express complex ideas. To the multitude of compounds which the Greek possesses that language at once owes its richness and its exactitude, so that by means of a compound possessing two or three eomponents it expresses that for the full ulterance of which several words would be required in Regists. For example, sweet/ων (web, γ/ων, ε, w. et, g, and φείγω, I fale) signifies I fale home out of a place canaly from sometics and space-shapfless (φ.), before, seri, down, and λupfless, I take) signifies I take something before someone cite. We may observe a few instances of such compounds: 6.6—

A noun which in combination takes the first place appears in its stem-form: as-

ἀστυ-γείτω», χορο-διδάσκαλος, σακει-φόρος, choir-teacher, skield-bearing, neighbouring city, teacher of danoing, warrier, where άστυ, χορο (χόρος), and σακες (σάκος, α skield)

are in the stem-form.

Consonantal stoms are in general united with the second compound by the connecting wowl o: as as a supervisor of the connecting word or as a supervisor of the connecting words.

This connecting a is found also after short vowels: as presentative, nature-inecutigator; lybrophyse, nature-inecutigator; lybrophyse, fish-cater; and is the regular representative of an a in the stem — as huspobphos, day-runner, where the first component is huspo, a day.

The o disappears before a vowel: as 200(0)1745, a choir-leader; arapthhypo, father's brother. Yet it remains in words which originally began with the napirate which is called the digamma, equivalent our; as sign (in Latin troy, pring); eleven (Doric Favor., Latin vipinti); feyow—e.g., bywograf (Hometic),
(Homesto), σημουργεί (Attec), nana-πογκετ.

The termination of n word is often in combination somewhat changed, especially if the compound is an adjective. Thus, τιμή becomes τιμος, and πράγμων: for examplo, φιλά-τιμος, honour-loving;

τολυ-πράγμων, much-doing (a busybody).

The termination -η (masculino and feminine) and the termination -ε (neuter) deserve attention. They are appended—

- To many adjectives formed immediately from verbal stems: as àβλαβής, uninjured: abταρκήτ, self-sufficient.
- (2) To adjectives whose second component has arisen from a substantive in -er (nominative -or): as δεκαετής, tan-year-old: κακοηθής, bad-mannered.

Without changing its nature a verb cannot be embined with any word except a preposition. If another word is united with a verbal stem, the two unite to form a noun—thus, out of Alexe, a store, and \$\frac{\partial \text{united}}{\partial \text{united}}\$, is \$\frac{\text{torm}}{\partial \text{united}}\$ and \$\frac{\text{united}}{\partial \text{united}}\$ as \$\frac{\text{united}}{\partial \text{united}}\$ and \$\frac{\text{united}}{\partial \text{united}}\$ and \$\frac{\text{united}}{\text{united}}\$ and \$\frac{\text{united}}{\text{united}}\$ with \$\text{united}\$ and \$\t

a sea-fighter, and thence runuaxeu, I fight by sea; also from es and spy-comes everyterns, a benefactor, and everytere, I act as a benefactor.

A substantive with an abstract signification may until with a preposition only by retaining its own termination—thus, Bowh, a determination, becomes explosed, a pre-ordination. In overy other combination an abstract noun must assume a derivation-entilige—thus, Midro and Bowh (Banko) give rise to Adaphah, a stanct-lavaring; rair; and page, give rise to meapage, a zee gight; and e and raphit; rete to meapage, a zee gight; and e and raphit; give rise to exerpatic, a good condition (well-being, wear).

in regard to signification, compounds may be divided into three classes: Determinatives, attributives, and ebicctives.

The determinatives are those compounds in which the secondary component determines the exact meaning of the primary and in these the second word is the primary or chief word. These compounds are the least numerous: as bythouches, a fellow-stare; baybooks, the lifty city (accopalis).

The attributines are those in which also the second word is determined by the first, but the second word is determined by the first, but the idea formed by the two is attributed as a quality to another word. Thus, algoryeous signifies not the same kind (rydros), but being of the same kind, having the same disposition; and agazyface and a long hand, but kaving a long hand or being longlanded.

The objectives are those in which one eloment is governed by the other, the latter being the object. to the former: thus, Seividalpur, superstitions, godfearing, where, ns in god-fearing, daluer is governed by dest, and the word is equivalent to robs daluoras bubús, fearing the dirinities. So helogos, reinholding, is the same as Ta fing From. In the same manner consider Acycypapos, speeck-nriter (historian or fabulist); atiahoyes, worthy of record; and xespowormer's, hand-made (that is, made by the hand, xepel worny's). Sometimes the first component is the object, sometimes the second. Especially common are compounds with the prefix ar- (arev, Lat. sinc, without), which before consonants becomes a-, and which, on account of its negative or privative force, is termed alpha privative: as avondos, unvertitou: dubrous, matherless (or in form more exactly, was .. motherly).

The prefix \$\vec{e}\$, rell, and the prefix \$\vec{e}\$ s, hardly, with difficulty, form many compounds: for example, circum, casily-bearing; burdeners, displeased.

VERBAL ADJECTIVES.

Verbal adjectives have two endings—one in -τος, the other in -τος. Those in -τος resemble in signification the Latin participle in -tus, as ποιητός

it do not contain as much vapour as it can, at its existing temperature and pressure, contain, it will continue to take up moisture in the form of vanour. i.e., to cause evaporation, from any water with which it is in contact until it becomes so saturated. Evaporation is going on constantly, not only from the surface of the sea, of lakes, ponds, rivers, or other bodies of water, but from snow and ice, from the leaves of plants and from soils, even those which appear dry. Since condensation-or the passage of water-vapour back into water, the converse process to evaporation-is also constantly taking p the formation of dew, mist, rain, snow, or hall, the amount of water-vapour in the air is constantly varying. The measurement of evaporation is ed atmometry; that of the amount of vapour in the air, hygrometry; and that of condensation,

Atmometry (from the Greek &rais, assis, vapour)
may be a matter of considerable practical importanoo, as, for instance, in the tropics, in estimating now far the utility of a water-tank will be insened by the considerable loss by evaporation from its surface. Such measurements are, however, very difficult to carry out satisfactorily. In oddition to the temperoture, pressure, and dryness of the air, the amount of evoporotion depends upon wind. As comparatively dry nir passes over the surface of water, it takes up vapour, and fresh supplies of dry air following it take up more. If an atmometer, ur instrument for measuring the amount of evaporation, be exposed, not only may birds bathe in it and spinsh the water, but min falling into it will have to be deducted; while if the instrument be protooted in a thermometer-scroen, it will not afford a trno measure of ovaporation of water exposed to sun and wind.

Professor was Lamons, of Minnich, Invented the following from of commenter (Fig. 14). An apen bearing following from of commenter (Fig. 14). An apen bearing for the following from of commenter (Fig. 14). An apen bearing for the following from of the fig. 14 and the following following from the following following from the following fo

closed above like that of a barometer, filled with water, and having a dise of paper adhering to the ground edges of its lower and by atmospheric pressure. The paper remains constantly wet,



Fig. 15 .- DINCS' HYOROMETER.

evaporation taking place from its inwer surface, and the loss is shown by the graduation.

and the loss is stown by the graduation. The result of unmored strometric observations in various parts of the world is that the amount of in various parts of the world is that the ence the coast is shown and surface of white nece the coast is shown and surface of the property of the coast is shown in the equator, rainful is estimated to average 60-81 inches, and evaporation 60-15 in; in London, rainful 126-72 hs, and evaporation 200-11. (See issuess in Physical Geography, 101-200-11).

Vol. I., pp. 208-5.)
In hygrometry, the measurement of the amount of moletare in the six, we may either determine directly, hy some form of instrument including one thermoseter, what the descripted in the result of the six is actuarted ander existing conditions of pressure, may be; or we may determine the six produces as the six and the six

The simplest direct hypermeter or pupil-resider (from the Greek dyarfe, pupil-res), cold) is that invested by Mr. G. Dinec (Fig. 16). It is on open vessel containing rey cold water, or ice and water, from which a pipe with a stop-cock leads under a sheet of black glass and round the bulb of a thermometer. On opening the top the glass soon becames deliced with a devy no closing it the water in the tube rises in temperature, and, on, its again reaching the development, the development of

plans.

A popular hyprosopy or interment for indicating, A popular hyprosopy or interment for indicating A popular hyprosopy or interment for morning in concern it satisfy of sowered, epenently Fastistic Particle Partic

(factus), that is, made; so years's (scriptus), written. Many, and perhaps the greater number of them, more nearly approach the Latin adjectives in -bilis, as empaores (mirabilis), admirable; or they express a simple possibility, as oparos, visible, an object that may be seen; accourts, audible.

Verbal adjectives in -rees have the same force as the Latin participles in -dus, and denote duty or necessity, as dorses (dandus), must be given. The adjectives in -res, like the participle in -dus, has three genders, so as to egree with any nom that may be joined with it. They may also be used in the neuter in a general way, as signifying necessity: thus, dwip Aurier devis (Lat. eir seleculous est), the man must be set free ; runtin torir & apera (Lat. virtus honoranda est), virtue must be honoured; yearrier

dowle (Lat. soribondum est), it is mocessary to write, Both these adjectives are formed from the verbal stem. An easy practical way to form thom is to change the termination of the first corist passive,

λύω,	Aufeis,	λυτόε,	Auréos.
TIµde,	τιμηθείς,	τιμητός,	τιμητέος.

KEY TO EXERCISES.

Ex. 12 O. EXEMPORE.

15. 13.—1. Good not for each third they through above.

15. 15.—1. Good not for each third they through above.

15. 15.—1. Good not for they have been about the first which is according to the control of the first which is according to the control of the first history at the first which is patched in the control of the first which is the first which which is the first w

law has no power. 13. May I he happy and due to the gold. Ex. 124.—1. Vet. 2. Tru. 2. Th. 4. Exp. 5. Thé-dressed. 5. 124. 7. Therman. 8. Therman. 8. The 10. Na "Arable Left. 11. August Serv. 10. The Serv. 10. The 10. Na "Arable Left. 12. August Serv. 10. The S And arparelluste sig the fluerepie narpojae pije slovjege.

ELEMENTARY POLITICS .-- V

(Continual from p. 312.) EMPIRES (continued).

AUSTRIA was now a group of provinces containing very various races and with various systems of administration, mostly ruled ulmost despotically by an Emperor (so called). Germany, after the thirty-eight small States, governed despothully, in almost all cases, by their princes, but mitted in z. sort of confederation. There was a strong feeling among the people that Germany ought to form one mation with one government. But the princes who would have been deposed by the change did no; naree with this view. In 1818 there was an abortive attempt at union. In 1866, after the "Seven Weeks" War" with Austria, thu Confederation was reconstituted as the North Gorman Confederation under the leadership of Prussia, and after the France-German War of 1870-71, this Confederation (which had involved a Zoffeere's or Customs' Union between the constituent States) became the German Empire. The President is always the King of Prussin, who is called "German Emperor" (not Emperor of Gormuny, which would imply that the "eminent ond other rights of sovereignty vested in domnin

the Crowns of the constituent States had passed to him) The Government of the Empire consists of the Emperor and his Ministers (who do not farm a Cabinet) and a Legislature consisting of a Federal Council and a "Diet," or Heickelag. The members of the former are appointed by their respective Governments, and vote on instructions from them,

Prassia appointing seventeen out of a total of fiftyeight; no other State has more than four, and most have only one. The Diet is elected in most cases practically by universal suffrage. To this control Government the States have ecoled various rights-including the right of coinage; of

imposing oustoms duties and certain taxes; of administering the railway, postal, and telegraph service; of managing the army and may; and uf declaring war. But Bavaria and Saxony, and, in some degree, Wurtemberg, retain their own army, and some of the States retain certain privileges as to taxation and other matters.

In short, the States are very mequal in size and privilege. All of them save two, Mocklenburg-Schwerin and Mecklenburg-Strelltz, have more or less of popular government.

Hore then we have a Federal Monarchy, a Confederation which military necessities have drawn more closely together, and to which national sentiment has given a permanent hereditary head. (Should the royal family of Prussia ever be totally extinguished, that of Bavaria would according to the Constitution succeed to the Imperial dignity.) As a rule, moreover, the head of the Pre-sian Ministry has been bend of the Imperial Ministry also; and, partly from Prassian tradition, partly from the personal character of the Emperors, the Grown lakes a far more solver part than in most constitutional morasilles in the detail work of a constitutional morasilles in the detail work of a few parts of the constitution of the c

by the Emperor almost despotically—though abortive attempts at revolution had been made in 1818. In that year, however, local Parliaments ostablished in most of the provinces of the Empire, and a Reichsrath, or Parliament of two uses, established for the whole. The Upper House now consists of peers, archibishops, and hishops, members nominated by the Emperor, and certain high officials, and mombers of the Royal Family, Part of the Lower House is elected directly, the suffrage heling widely extended but not oniversal.

Part, however, is elected by the morellents of the large towns and part by the large landowners; so that there is direct class representation. Somewhat the same plan is carried out in the local Parliaments throughout Austria; but they con-ust of one Chambor only, and certain bishops and high officials have seats in right of their offices. Hungary from the first refused to send mombers to the Reichsrath : and after the defeat of Austria in 1866, it was found ssary to conciliate it by restoring its liberties. Accordingly, Hungary has a Parliamont of its nwa, the Emperor of Austria being King of Hungary, and the two countries being united only for military s, foreign affairs, and, in part, finance. To deal with these a sort of consoltative committee, the Delegations, is appointed from each legislature annually. A large party in Hangary, however, claims total administrative separation from Aestria; an-other in Bohemia demands that that province shall be put on the same footing as Hungary; and the Italians, the Poles, and the various Slavenic races which make up the bulk of the population of the Austrian dominions ull claim greater is depende It is therefore bardly to be expected that Austria. can long remain as she is.

In these cause, we see that "Emperor" has meant a ruler over a group of rulers or governments. It is obiedy on this ground that the adoption of the title "Empress of India" by our Queen is defensible, Napoleon I. adopted the title partly from Roman traditions and partly because he aimed at being the supreme arhitrator of Europe; Napolcoa III. followed his unele. Elsewhere as in Mexico and Hayti (occasionally), the title has marrely been used as a grandlose equivalent for "King."

" CHURCH AND BEATE,

So far as the history of Europa is concerned, there can be no dambt that Church and State were originally simply twn aspects of the same "body politic." The Church, it must be remembered, politic." The Church, it must be remembered, includes the laity as well as the clergy, just as the State includes the ordinary citizens as well as the Sovereign and its officers. Now the earlier States of Europe cannot be said ever to have established the Church. The dectrine had come down from Pagan times that every State was under the special patronage and protection of certain gods: to deny their oxistence or refuse to worship them was an act of robellien; and the carly Christians were persecuted, less as horetles than as rebols. bring ln a now God scenool to be overthrowing the foundations of society. Now when 'the Roman Empire was converted to Christianity, the ecclesination in gunisation tended to correspond in its subdivisions to the civil. The ecclesination "provinces" and discuss corresponded to the civil provinces and their subdivisions. Indeed, we still speak of the province of an archibishop and the seeso of a bishop, because those terms were used in Roman civil administration, though of course, es the Roman Empire went to pleces and the Church grew, and multiplied its bishops, the correspondence on came to an end. Similarly in England, the Angle-Saxon bishoprics originally coincided in area with the Angle-Saxon kingdoms. The bishops and in the King's "Conneil of Wise Men" (which has grown into the House of Lords), not because they represented the Church, but because they were some of the most prominent people in the country. The clergy, like the nobles abroad or the Commons, formed an "estate of the realm" both in England and in the Continental kingdoms. Nor were ofther hishops or clergy in any way pald by the State. Lands were devoted to their sopport, either by the King-out of his personal domain-or by the nobles ar private persons; or, more commonly, charges were laid on the land in perpetuity for religious purposes; but there was no formal "establishment" of the Church. Heretics were all but unknown, and when they appeared were treated rather as rebels ugainst established authority than as offenders ugainst religion. But the notion of two distinct bodies, Church and State, was promoted partly by the growth of the power of the Papacy and its constant conflicts with the kiogs of various Maronana States: partly by the existence of the not one boily, but a great many. Each cathedral chapter, each diocese, each squarate parish for rather its person), has its property separate from all the rest. Much of this, it is true, is under common management, and it is samplemented from certain common famils (which, however, do not legally belong to "the Church" as a body). Some of this property has belonged to these various owners for contaries: much has been recently given. There is no means of necurately distinguishing the new from the old, nor can anyone say at what date the line should be drawn. Of course, "the English Parliament is ounipotent": there is no law preventing its altering the disposition of corporate property, and there is plenty of precedent for its. doing so. Much may be sald on both sides, both from a religious and a political point of view. But it is important that we should see exactly what the problem is, and comprehend its immense difficulty, of which only the barest idea can here be given, We may refer those readers who desire a fuller statement to the late Professor Freeman's little book, "Disestaldishment and Disendowment."

SPANISH .- XIV. Dealmort from a 19t i

TABLE Containing the Verbs that govern Certain Preparitions.

Alcianruse à les pugnes, Alcialianse a la suerie Aborarse con alganes, Alochoraryse de algo, Alegir jer ulguno. Alegir jer ulguno. Alegiar d nas mase. Abrasarse en descus Abundar de remeas. Alaurido de las disgra las Alaurido de las disgra las Alausar de la ambiad. Analist de veuir, Acterres tal ficings, Arritary, ced ly ca-a. Acqueres a styrida,

Acoused tree e, con o'to dietamen. Arminiatores con intro-Acontegarer con de entare. Acontecer e los lucuitos, Acontecer e los lucante Acordase de la preside Acordinar de trego, Actuare of, or been alguno,

Adelantarse di etros.

Atlofecer de alguna enfermeda Aferraise en, con su menion, Affennarie si, siculgana cesa; Afarmarie en la diche, Agraviarse de alguno,

to be in advance, or to take the lead, of others, to adject to another spinlon. to be all of some disorder, manion. to be food of anything. to affirm what has been said.

In this of drugger, to flatardon on self to chance, to flatardon on self to chance, to be charged on the change of
no filendship.

house to the shelter in a church, to conform ince-if to mother opinion to keep campany with others, to take council with who men.

le acquaint on self rest teast-

to prace count of real wise to happen to the movary, to remember the past, to prace one off a fook

la get could with me.

tor N

for her front course to happen of such a time to find out or hit mean the Aborenjarse en las espaidas, Alsorrar de inzones, No alsormese con ninguno,

No altorrarse con ul Alrarse con alguno, Ajustarse da mazan, Ajustarse con alguno, Alabarse de vallente, Alargarse di la chelad, Aleganse de su Herra, Alisacularse de, con y Alimentarse de, con verb

Allmaree à la juste, Amanesturse con les libres, Amanaree à escilier, Andar con el liempe, Andar de raya, Andar na picitos, Andar na picitos, Andar por tierm. Andar nor tierm. Andar ni, por mayor fortuna,

Anticiparse d'atro. Assar en la tillera, Aparar en la num. Aparererse ii algum,

Amprocese es el camino. Aptrojarse jena el trabajo, Aptritarse a un lado, Aptribuerse de, d. per alguno, Aperise de su oplanon, Aperistigar con alguno coca, Apedingar per los peliario, Apedicar con los palabras, Apegiros o alguna recu, Apedir de la senti acia, Apedir a otro medio,

Aprelidese de arrare, Aprelidere di, pero la lettalla, Apterbio de, per trobes, Apiteltase de los polores,

Aplicare e à les estudies. Aposterarse de la hage tela,

Assistar ii correr. Ajacontare é venir. Apresentation devolts, Apresentate per al cultivata, Apresentat per la clubbata, Apresentat per la clubbata, Apresentation per el culcio, Apresentation de clubbata, Apresentation de la consistenta Apresentation de la consistenta Apresentation de la consistenta Apresentation de la consistenta Apresentation de la consistentation de la consistenta and consistentation de la consistentation de la consistenta and consistentation de la consist Apto pua el empleo, Aparado de medios, Anler en ile wer-Arderse en quimeras, Arrebezase em atzo.

Arrectise de frie, Arn glarse a las leves, Arn gastarse d'alguna cost, Arretorter é, cos, es tor el Arrestates d talla

Arrilar á tirra, Arrinarse à la pareit. Arrinconarse co rasa, Arrogarse (algo) è si misme,

Arrojarse e petcar, Arrojarse cor ta c qu. Arrostrar e, con les pellaros, Asano de calar, Ascenter á otro capico,

to sarfelt oneself with food, to get astride upon the back.

to get astride upon the back, to spare most sue.

not to spare unitsue.

not to spare unitsue.

to be angry with anyholy, to be rightly inclined, to be angry with anyholy, to be rightly inclined, to be used to bused in bravery.

to havior to the city, to be replaced at anything, to be replaced at anything, to have one's country?

to be the contiguous to another's to be contiguous to another's to sheet to what it is not.

to subselt to what is just, to be foul of tooks, to be clever in writing accommodate one-if to

tium, to walk with a cleak on.

to be liftighted,
to go on all fours,
to be humbled to the dust,
to wish for or cover better

to wish for or caset before furture, to anticipate number, to anticipate number, in large ground the hamber, to receive with the hamb, to present annual suddenly before anyone, to present mesent and the read to present for the full number of the read to mesents for their

the ruad
to prepare for work,
to retire on one side,
to be enshaunred of anyone,
to change one's opinion,
to motertake may thing with

to time dangers, to time dangers, to time dangers, to alone any one with words, to appeal from the sentence, to have recourse to mailer

messure. to petrale one of reith anas, to get nody for lattle, desired by all, to have compassion on the

INNE. to apply onesolf to study, to take presenting of the pro-

to take presenting of the property.

to bet an a race,
to make lastic to come,
to make lastic for something
to take first hold by the way-In take first hold by the waist-to be approved as any faculty, approved as a warming and obspect of the office.

In appropriate to one-off,
in appropriate to one-off,
in appropriate to one-off,
in the observed of the observed
to hapevor for wirthe
to when the opportunity,
in for the supply ment,
calculated of means
to hum with deduces
to multiple observed
to multiple one-off in the anything.

to haiffle oue-cif up is a fidug, to be beaumied with cold, to conform to the law, to be inclined to anything, to assight the wall.

to be enterprising in everything. to reach loud or the shore. to been opinion the wall, to shut one-self up at hour, to appropriate anything to opeself. oneself.

to corer ourself with a cleak-to face dangers, to be scorelest with heat. 'to rise to another other.

olergy as a separate class, marked off by cellbacy. with privileges of their own, and a law of their own-Canon Law-administered by their own courts; and indirectly by those theories of Roman law which, applied to the kings of mediaval Surope, eventually nided the rise of absolute monarchy like that of Louis XIV. of France, which the Tudors and Stuarts tried unsuccessfully to establish in Rugland. If the Sovereign was responsible only to God, it followed that it was his right and duty to control the religious beliefs and practices of his If he disagreed with the Pope (whose infallibility was then not an article of faith), it was his duty still to follow his own view. In Germany this was put concisely during the Reformation in the Latin maxim, Cojes regio ejes religio (i.e., " He who has the country enforces on it his own religion"). States changed their faith as their rulers change theirs. Moreover, Roman law had held that all corporations were subject in a special way to the State, which might dissolve thorn or alter the disposition of their property as it thought fit. The same power was claimed and exercised by Honry VIII.—for instance, in the dissolution of the monustories; and even nominally Roman Catholic Sovoreigns have often suppressed and disendowed the Josuits in their country, or single monastic holies. Again, the conflict between Briscopacy and Paritaulsm in Eagland was not a conflict hetween two sects. It was a conflict between two parties in the Church as to what the discipline of the Church should be. That Nonconformists coold exist side by side with the recognised forms of religion was an idea which grew up slowly, daring the Commonwealth and even after the Restoration. This notion that the Church is simply the nation

ampaided for religions between its off; between communications and the second communication of the communication to several) religious bodies. It can thus control their excessive soal if necessary, and secure the advantages of religious teaching. The Church, on its part, guarantees to obey and support the

In many Continental countries this view has been acted on. In France at the Revolution Christian worship was formally abolished, and the property of the religious orders and the various religious corporations was confiscated. Then Napoleon L re-established the Roman Church, making a formal agreement us to terms, or Concorded, with representatives of the Pope. The State pays the Catholic clergy (and the olergy of any sept which reaches 100,000 in number), and controls to some extent their appointment. Similar Concordats regulate the position of the Roman Church in other Continental States. But this contract theory easily passes into what is inaccurately known as Brastianism. Erastne was a Swise of the sixteenth century, who, at a time when ecclesiastical synods exercised severe discipline, maintained that the power of punishment should belong to the civil authority only. Now the word is used to denote the theory that "the Established Church is a branch of the Civil Service." If the State pays the clergy, it may easily claim to direct them as to what they shall teach. The French clergy are often reminded that they are "State-paid officials," and for extreme interference in politics are punished by the suspension of their stipends.

Finally, the theory of Voluntaryism is held by many Liberals and almost all Nonconformists in England, and felly realised in the British colonies and the United States. According to this view, the State and the Church, or Churches, are wholly distinct. The State should have no more to do with the Churches than with any other association. any association mismes its property, or interferes with the logal rights of its members or others, the State can and does interfere. Similarly, it snterferes to regulate the application of the property, even of Nonconformist bodies, if the trusts on which the property is held are not observed. But farther than this the State should not go. The ideal to be aimed at is "a free Church"-or, rather, several free Churches-in a free State.

Dissabilishment and Dissadowment, in Negland, involve the replacement of the system implied in the first theory by the system inspited in the first theory by the system inspited in the fourth. The problem is tumonosely complicated by the fast that it is the first system we have to deal with, and not the second or third—that the Chorch is seither a body that has made terms with the State, nor a department of the Givil Service. As to exceed, the Chunwhof Siguland is one body. As to property, this

Congenier ou algeno, Congelmar algo de, por señato be congenial to anyone, to conjecture anything by to restrict augments of the manufacture of the manu Congrarianse con alguno. Geografulers: de algum press, Committee algo con idia ruosa, Consentir en algo, Conspirar es un intento, Constar por escrito, Contaminarse de hercaus, to ruler irbia conspiner. to state or writing. to hold to me - contract Continuerse en su ubdiamento to weigh our thing a plan or with mother, Contiapesar mis cost on etta. Contrarent é la ley, Contribute our dinera, Convenientse de la race to transaces optical the Lin. to contribute money, to be contineed to reach Content es alguns esc., Conterar es malenas de catato one top a mything, to contrast men allales of do, Convidar à alguno con dimens, stale. because the any ledy, because the money to any ledy, because a meeting, to our operator or any time; to be granted by Lemelty, to be granted by Lemelty, to be granted by Lemelty, to be granted by the corpil of the couple of the form of the grant of the couple of the couple of the form of the f la elt i money le anyle di. Convocar e junto. Convocar e junto. Corressed verments Corresponder a los le marces, Colejar la copar con el cananal, Cardiar on el curarso Cuidroj o dauno, Culpar e timo de cinto Cample on abuses Camplir ess su obliv o son, Contro es a dud, Contle e el mar, Contolo del s d lter a nizmo de pol -, lter de tilanes, to beat anyone with a stir . to but the mal.,
to be feedish, v busseal,
to suppose anothers or
to acknowledge one di Itat en tombe :-Har por visto. to incheshedge one di-renque red to fully come souther dy to cupler one strum as stell-to leave of warder. In groupe one off if the so-Decretedes nautoral of ik dien sa tampere'r stylio. Ik jer*ik i s*erilar, In labor e of fee ... poles, to depend a sarvively to desirementaling to divote one's seer to Depender de alguno. De trengar de alguno. listrenga de alguno. Lista de alguna no s. and their Descratorelo é alenti letes Bestgenerum communication to import once together communication to import once together communication and best complete of edge.

Designopherum on, consistent to the order on the communication of the communication on the communication of th the ental craise on algumest at the puzzle cone's brains to had ent something.

The service of the foliage to rest for all five to rest to perform them, to surpress others to surpress others to unstruct amore to disclose one of to unport to to detail for more soft product to the form of the first one for the first of the Describer e des otres. Describer de alguno, Describer pe con alguno, Describbatse de su eldigación, It decirds suchtable. Desileñarse de algua vere s to died on anythma. tresubenaise or ve in-Desertar de las burcheses. took sett the stand not Designate of Both to turst rafe to us to encounty anyone the li-to on also myone to make from sleep, to be come depopulated to turke up for our's loss. To constitut oncounty of to lar 4 mfe te n 5 Destreally a algure. tte-mentir a alguno, lte-spectar a alguno, De spectar a alguno, Us speddarse ale gento, De spuitarse de la peotolo, lte-spuitarse a llocac, to consume operall out weep-Iba Destrizarse de cufeño, to repain one off with meser, to lose on 's war. sympse del camino, to be anxious for simething, to be should by difficulties. Devenuse per algo, Betempe en illientado.

Himarse de conceder aleo. Degeslarse de nha com. Disponer de los bienes, Disponerse à ramina, Disputar de, poère mei rosa, Illiantir de atro decimen De-untir a alguno de atguaz es a, Drudir per untad, Rolado de ciencia, Rudar de alguna cesa, Rutar per unicho tiempo, le 21. Enteroprise expelos, I'm such ter en lin. Ememor e con alguno, Publicare del pecho, Licernas con la boliura, Lint- meler de atgmes co. a. Converse no corres offa. entrade un da . E ercode moto. Escoler cotra cosa. Escoler sa nal trans. o alguno. Estampa er pipel. Estampa er pipel. Estar e la étden de otro, Esta de viste.
Esta es annatule.
Estar es annatule.
Estar pares du.
Facil de discrir, Fall et et la pelalera, Faller de atenna pente, Faller de julco, Fastidlus-s de nepulnes, L'inorere se de alguno, L'iju en la pared, Escrito de combleson

to combinered to crout ansthing to be disgressed with anything. to distance of goods. to dispute on set about any to dispute on in about anything, to dispute from anothers option, to dissande anyone from any-thing, to disple into habres. endoned with lenning to doubt merching to last a long time

Echur alco es, por herra. Embedar e cor, els, e e elgun e follow my thing on the earth, to be almohol and anything. ross, Embor usera el mente, Embattr de algeden, Emundatse en la corrección, to be in ambush on a full. to line with cotton. to the war reason.
to be suggeded by convetion
to be sucked with water. Empirerse en agua, Empirejar con alguno, to jest one on a level with any-Emporentat ose alguno, Empeñar es ca ma cosa, Emperar es por atguno, Emplear e de alguna cosa, to be related to myone,
to pledge onesoff to a thing
to take part per mother,
to employ outs it et at a

'n thing to all and auxilians Pura mane de alegan anos Fit is more de alguna co-a. Emmon erce de alguno. Encular una nave de arena. Encular una nave de arena. Encularare esc. per, de la parel. Em arares d. con alguno. to be comed to all success
to be comed to all success
to fill in love off entones
to run a slip so the said,
to climb up the wall. to face another. to nedertake any tanànasa, ta be distin de in mantanang Encredictary also to la sa-

anything. In become victors, to kindle out auger. to kindle will mayor, to be inflated ownlot amyone, to live an prin of the broast, to keep your cide fortune, to be one thing to another, to be some expert in may thing, to be come expert in may thing, to be come expert in the principle of the made extract may thing I'nta ar algen a cost one otra, m tyanne, pun algunt ema, Linguist of colleges con-Enterder e este te godes. Publish e ce al pun te godes. to be vell nequinited with any Entrar or al more ports. Entrar locales as in its destroy to metalle cor' another's to middle cor mother's attitis to mistale one thing for me

Prince are served to a superior of the first limited, or scatty, in means, to excel another thing, to exceed be a thousand reals, to excuse open if I amore a. to struop or paper, to be made another's orders.

to be even journey, to have a talked to, to know what is doing. to be going out, to be in twom of anyone, to be near leppening.

easy of dia ston, or to digest. to break one's word, to be missing for a somewhere, writing in judgment, to be disability with tool. to avail opeselt of anyone, to its on the unit. in titch combition

to take up one a acoust is not your yours. To extee with everybody, to extee the advantage over mitters, the advantage over to be advanced of eaching, to agree with anyone, to this and mencell with election to the acoust to could a center from an inferior out it is only to one to o rgouante d pedit, rgouante de algo, ariguante con alguno, arec de tapa, scer alguna coma d si,

name with imager.

I man with imager.

In rout with singer

In rout with singer

In with fricks.

Its struggle with snyeas.

Its drivel to anyone's health.

Its will bill sniger.

In with sight sniger.

In move far all parts.

In move far all parts.

reserva de hondiro, nmar do corrego, car a cherco, corre con alguno, indar con regulos, indar el ne adud de alguno, far de res, (llir es, por todas partes, priamo de algo,

CutCuther de pión,

Tobler de in sunto,

Corre y, todos los portes,

Cuter en tierre, en element,

cuter el en ellement,

c

Control to May Processor (compared to the compared to the comp

car (lux) d alguna to communicate (light) to any

Charles (and) 4 Algens to Communicate Oligid) a sery communicate Oligid) as explained to the Control of Oligida (see) as explained to the Control of Oligida (

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Conformance on al thempo, to conform to the times. to be conformed what one conform for the times. to be conformed with what one seem.

Confundation is not provided to the conformation of the times. To be thrown (one's senses) into conformation.

Poner a offeio. Pouer es alguna parte, Poatr por corregidor, Poscido de temor, Postrudo de la cafermedad, Postunio de la caferni Postunia en cuina, Postunia en tierra, Precedido de otro, Preciarse de valiente, Preferido de alguno, Presidarse de alguno, Presidarse de alguno, Presidarse de alguno, Presidarse de alguno, Preocuparse de alguna com, Prescindir de alguna com, Presider a otros, Presider en un tribunal, Prestar para la salud, Prestar para la salud, Prestatir de docto, Preventrese de lo necesario,

Pringarse en alguna cose, Privar con alguna, Proximo e motir,

Quebruntar los luceros a alguno Gaebar el corazon a alguno, Guedar de alento, Guedar de pies, Quebr en casa, Guedar por ondar, Guedar por enbarde, Guedar por enbarde, Quedar por enbarde, Guedar por enbarde,

Querellas se de su vermo, Quemar con malus razones, Quemarse de alguna polatira, Querdo de sus anugos, Quitar d atguno, Quitar de atguno, porte, Quitarse de quimeras,

Raldar de lumiliro. Rabiar per comer, Rabian se en la virtud, Raer de alguna cost, Rayar con la vutud, Recalcarse en lo dicho

Recatato e de alguao, secutai e de alguno, Recibir a cuenta, Recibir e de abezodo, Recibire de abezodo, Recibire de abezodo, Redoudearse de desdas, Redoudearse de desdas, Redoulor ea neueucio, Reirse de carcajadas, Reirse de alguno, Renegar de alguno cosa, Resualia se de las manos, Resentirse de alguna cosa, Residir de astento en alguna

recording to the superior of the property of t

to put in business.

to put in business.

to put somewhere,

to appoint no conregidor,

postessed by fear,

provinted by sickness,

to be contined to once bed,

to kned down on the ground,

preceded by mother,

to pique oncelf on courage,

preferred by anyone.

preferred by anyone,
to be taken coth anyone,
to be taken coth anyone,
to be taken coth anyone,
to ke root in the earth,
to be preoccupied by anything,
to preside one anything,
to preside one of thee,
to preside in a tribanal,
to contribute to itealth,
to ext up for a man of learning,
to provide oneself with necesseries.

saries.
to intermeddle fu anything,
to be intrinate with anyone,
at the point of death.

Q.

to break anyone's house, to break anyone's heart, to break anyone's heart, to resunts it is, a place, to be held to be held to be have to proceed further, to be bell, for anyone, to be bell, for anyone, to be bell, for anyone to foll to usy share to vion short in a dream to vion short in a dream to vion short in a dream to be held to be he

R

to be very hungry.
to long to eat,
to be fixed in virtue. to serape from anything. to excel is virtue. to be firm in what has been to be cantings with anyone

to be entitles with anyone to receive on necount, to receive at home. To be adulted as a councillor, to pay anyone his wage. To pay anyone his wage. To the pay anyone his wage, to conduct to the kenefit to laugh ineartily, to laugh anyone, to anyone anyone to he return to his anyone, to any any from the hands, to resent anything to be settled in any place.

to reside at court.
to resolve upon anything,
to resolve upon anything,
to autwor the question
to ratura to one a house,
to relie futo solitude,
to take refuge anywhere,
to hunts eith laughter,
to burst with audere to speak,
to be averated with authority, to real autome of money.

to upset,
to encompass on all sides
to beganything of autome,
to break in any place,
to rub one thing again

Saber d'vino. Saber de trabajos, Sacar d' la plazzo Sacar de alguna porte, Sacar en limpio,

Salir a niguna coon, Salir con la pretension, Salir per finder. Saltar d' la ineginacien, Saltar de gozo, Saltar en tierra,

Seniarse en la meta, Seniarse e la silla, Servir de autyordomo, Servir en julicio, Sineciarse de alguna cosa,

Sitiado de enera cos,
Sitiar por hasiore.
Sobresaltarso de alguna cosa,
Sobresaltarso de eneração,
Somer di nueca,
Somer di vocca,
Sospedoso da alguno,
Substâtir del auxillo ageno,
Sustraceade de la obediencia,

Supeditado de los contralos, Supilear de la sentençia,

Surgir en el puerto, Surtir de viveres, Suspenso de oficeo, Suspinar por el mando, Sustentarse con yerbas, Sustentarse de esperanzas,

Tachar a alguno de ligero, Temblar de frio, Temblo de muchos, Temble à los contimios Templarse en couer, Tenerse en ple, Tenir de azul, rectice on pretractice of the preTime por tal past
Tituter of frish,
Tocar of alignum, partic,
Tocar of entire the preTocar of entire the pr

to draw advantage from any-Utilizarse en, con alguna cosa,

Vacar of extudio, Vacarrae de alguma cosa, Vacharrae por la boro, Vacilar en la clección, Vacao de ontendimiento, Vacao de ontendimiento, Vagar per el mundo, Valunt en tal procoo, Vanagioristre de alguna cosa, Verino di trono. Verino de Antonio.

to taste like wine:

to be acquainted swift trouble,
to take to the market,
to take from any place,
to copy fair, or clear up
double.

to copy hair, or even my double.

double.

double.

to stain one's aim. to appear es security. to strake the imagination. to leap with jow. to leap with jow. to leap on the ground, on short.

to sit down to table. to sit down in the chair, to sit down in the chair, to be a sorvant in a palace. to claro overeif your point of color overeif you point.

to clear oueself from some thing. besieved by enemies,

besieged by enemies, to starve out.

to be starried of naything, subduced by enemies, to sound hollow, deaf to the cries, suspected by anyone, to subdict by others' aid, to withdraw from one's oball-

ence.
subdued by the cuemies,
to petition against the sentto petition against the sent-cines.
to ride at anchor in the port, to supply with victuals suspensed from office, to aspure after command, to support one off on his be, to austain one off in his be,

To concess, anyone of levity, to trends each of solid control of the control of t to trumph our the energy.

to attend to study, to be emptied of mything, to be open-mouthed, to hesitate in one's choice. emply-headed,
to wander through the world,
to value of such a price,
to be pulled up with pride
about onything. near the throne.

```
Velor d les inneres.
Veneres a alcuna cesa,
Venerile de les en iniges,
Venerile de les tes en iniges,
Vener con alguno,
Verse en allura,
Vestir e la inicia,
```

Vector d la meda, Vectorse de paño, Velcinaries en alguna esta, Vistr de llincean, Vistr por millagro, Vistr por millagro, Vistr por el altre, Volter por el altre, Volter per la verdad,

Zafare d' alguna cost. Zambucare en algun, perle, Zambucare en agun. Zamburare en agun. Zamburare, la tenie al., to watch I willed evil, to respire ence-off in anything, ecospiered by the manay, to seven, consects or another, to meet account to such a failure or first state on, to be seven to be about the same and the seven the state on, to be seven to the same to be seven to man thing.

no dress in the fashion, to leadnessed on cladh, to leaviselent or anythnost to live by sims, to live by sims, to live by a moracle, to live relation care, to the first like air, to dreft and the traffic.

Z.

to escape my flong.

To bide one self in any place,

To dive and water,

To bounder is the storm,

TERMS USED IN COMMERCE.-III.

PRIME COST.—The first cost, before charges begin to neeme.

to neerue.
Princetral signifies the responsible person. It also applies to the partners in any establishment, who are sysken of as the principals. In Banking,

the sum on which the interest arises, PHIVATERR.—A private ship fitted out for warlike purposes under a licence from the Government.

(See Letters of Mergue.)

PROCLEDS.—The neural result or sum produced by any sale.

PROCTOR —An officer in the admiralty and coolesslastical courts, corresponding with an attorney in common law or a solicitor in conity.

Proof unities.—The representative power derived under the numberity of unother, either by letter or power of attorney.

Propuen.—The raw productions of a country; a term more frequently applied to those of forcien growth, such us ten, cotton, sugar, spices, drugs, and dies.

I'm's FUMA'—Two Latin words, signifying for the rate of form. It is customary for morehants and others to make my pro formal incolers and account subseparions to entering into an adventure, in order that they may form correct ophisms as to its probable rows. These accounts are made up in the exact form that they would assume it the charge on purchase or sale may be lost sight of the welling prives being, of course, estimated according to the expectations of the parties.

Promisson's Note.—A written promise by one person to pay mother a specified sum of money at a stated date. It is subject it the same laws, and may be transferred by indorsement in the same way as a bill of exchange. PROMPT.—The term of credit or period fixed upon by contract for payment of the purchase money for produce.

produce.

IN BANKRUPTCY.—The requisite proof, by affidavit or outh, of the correctness of any claim made upon a bankrunt's estate.

PRO RATA.—A Latin term signifying proportionably.

PROTEST OF A DILL.—A declaration made by a notary or other person of the presentation of a bill (either for acceptance or for payment), of the roply

recived, and of the refusal to accept or pay.

PROTEST (SHIP'S).—A declaration, made by the
master and erew upon onth, of the particular
circumstances under which any injury to a ship or
cause of thunger to her careo has urisen.

PROXY .-- Authority placed in the hands of a

deputy, as a substitute for its personal exercise.

QUARATHE—A regulation in force at certain

ports, catting off and interdicting for definit

perfects all communication between ships and the

shore, on their arrival from places commonly affected

with contactions diseases.

Quin Pino Quo - A Latin phrase, signifying one thing for another. The mutual consideration in contracts.

contracts.

QUOTATIONS.—Stated prices. It is usual to quote
the prices of certain articles, inclusive of the charges
incurred in their delivery on board shap, which are

rerused quotations f. o. b (free on board).

RATE OF EXCHANGE—The actual price at which

hills on a foreign country can be bought.

REAL Property. — Property that cannot be moved, such as land, houses, etc.

REBATE -A return of discount by bankers and others upon bills taken up by the discounter pre-

RECEIPT.—An acknowledgment in writing of having received a certain sum of money from a person named.

RU-EXCHANGE—A charge upon the drawer of a dishonoured foreign bill of exchange pon a redrawing by the holder. Whatever expense or damage is incurred in consequence of the dishonour of the bill is included under this head. The whole as, however, frequently consolidated by custom into fixed percentage rates for particular places.

REPERENCE.—The direction given by a person requiring credit, to the trader of whom he requires it, to a third party, who may be questioned relative to his commercial standing.

REGISTRATION.—Registering ships at the Custom House so as to entitle them to the enjoyment of the privilegres attending British-built vessels. A certificate of registry is granted, which states the build, tonnage, and names of the owners and muster, and SPANISH. 345

		i. (Meterse en les poligres, Mitter à oriente,	to expose oneself/o dangers, to face the east. to book for myour's interest, to tro oneself with working, falegood with walking.	
	Oleve d enego do otro, Ouese de una peste á otro,	to draw a bill spen another, to teel free one safe to an-		to look for auvent's interest	
				to tere openelf with working.	
	Girer per tal parte.		Molido de under, Monter si caballo,		
	Gosar de alguira cuas, Graduar una cosa por, de bassas,	de reliek anything			
	Grangeng ú. de skrium	to presente execution of soyees, to gain the affection of soyees, to like anything,	Montar or colera, Mortr de paca caled, Morrose de Irso,	to get into a passion. to die at an early age,	
	Grangeur ú, de signoo. Guster de nigona cosa.	to like any there.	Mont de poet estad,	to die at an early age.	
			Montas per lorrar alguna com	to be dying settl cold. to long to obtain may being,	
	1	l	Morres per legrar alguna cova, Motejar de ignorante,		
	Dubbe es Grispo.	to telk subberish or Greek.	Muticar on razones, Musicr de intento,		
	Hacer et todo. Hacer ele vallente.	to be hearly of anything	Multise de casa,	to change oos's miral, to resnove from a house,	
	Hacer de Vallendo		Humauser of alguno,	to mirrour appoint money.	
	Haetaran de combia, Henchir de agun,	to Bli with nates.			
	Hereir en de mento		1	N.	
	Hereir en, de gento. Historica de rodallas,	to kneel down. to chumble on anything, to rejeles at anything.	Naver con fortuna.	to be been to fortune.	
		to strutble or anythreg.	Namer en las maleus,		
	Helganic de, con alguna co-a, Himanario con les internesses.	to rejeice at any thing,	Sacer jerre trabajos,	to be born to labour or troubte, to drug enessif to company.	
	ATTACAMENT CAR AND MASTER (AT	to constitution in Literature	Named and an equipment of the state of the s	to druy aneast to company.	
			Notar de haldador,	to consume ne a talien.	
			Nacer pains trabapos, Nacer pains trabapos, Nagasse à la communication Nambura pour el caspileo, Notar de haldador, Nunio es an proceder, Nivelaire u le justo		
	hioneo para alguna cosa,	fit for anything. to indus with.	Navetarre et la 1846a	to conform to what as just.	
	Imburde, or, Impelido de la nevesidad,	lo imbus with, hapelful by necessity,			
	Інронег иол реш и гідине,	to hapose a pracity spec any-		3	
			Obstar a una cesa,	to hinder a thing,	
	Impendrat de lamas,	to stope int on the well unbecoming his age.	Ocuparse es trabajas, Ofenderoe de, con alguna cosa,	to be occupied with week, to be oftended at anything, to smell of ameritang eire, to forget the pret,	
	luipropriosie, en, pere vacatal, Inspelsitio de en eponou, Inchite en enipo,	ulestinate ea me's enemen	Oler A atra cost.	to such of somethmenters	
	localit or culus.	isbellante es ono v openion. lo fall egren into a fault.	Oler é otra cons, Olysdane sir lo jessalo	to forces the pard.	
			Oppunit ass el podet, Ordenaise de saccidote,	to operous by power, to be ordanced as a priest,	
	Inductivo de error, Indultar de la penn,	leating to error	Ordenme de saccedote, Ordist e alguna parte,	to be ordained as a priest, to draw sear to any place.	
		to court the punishment, tunted with herestes.	Comme e argues parte,	to down after to any piace.	
				P.	
	turinte en alguns co-a, Ingrato di los beneficios, Ingralo cos los amigos,	nugmicful for lessouts. nogmicful to friends.	Pagarve de buenas sanones,	to be naturalled with good res-	
	Institute out to poleroses.		Paluocar d alurano.	to elen probade	
			Panir en casa, Panirse si descensar,	to cisp anybour, to stay of house.	
	Inspirar d alguno,	to inspire anyone, to encop full unother's favour, to introduce obsself to those	Pararse si descansar,		
	internative con alguno, introductive con los que man-	to encop (allo unother's farour.	Paratre ces algano, Parceer en alguna parte,	to steep with currence to appear anymbers, to resemble another	
				to treatable snother	
	lugarir un áriot en etra, ir por el commo.	to graft our tree or another, to go in the road.			
Į	ir par el casamo,	to go in the read.	Partir per stated, Past o Medical,	to divide to belves.	
	_		Peter & Majire,	to go be Madrid.	
	1		Pararrie Sovilla,		
	Lamentarse de la disgracia,	to lament the mist etune.	Pasarve de surdora,	to be over-rips, to become a scholar	
		to but t creself agulastu strue.	Pesarso de bristo,	to become a eshelir to take a walk in the country.	
	Landinario de algunes,	to take pity on anyone.	Pasetres per el canque, Pecar centre la les. Perar de ignocante.		ŕ
	Lege les pen-muirates d'alguns. Limitar les facultades à Alguns.	to take pity on anyone. to read anyone's thought to hult anyone's pouve.	Perar de ignecembr.	to transgrees the terr. to an ilresigh ignorance, to be fastly in anything, to sen through excers, to ask something of anyone.	
	Lindar cos. Llevarse de alguna puston,	to be adjoining in.	Peter es alguna ora, Peter per dramas, Peter alguna er-a a alguno,	to be faulty in anything.	
	Llevarse de alguna puston,	to be cirrus sway by seems paydon.	rectr per drama,	to sale possestions of supress	
	Ludir was cons on otra.	to rub one thing one of an	Polar de justicia, Polar de justicia, Polar contra, es la paved, Pelarso per algo, Pensier de alguna coos,		
	man man to-m sett office.	other.	Pegar contra, es la pared,		
			Pelarso per algo,	to be unxious for something.	
	31	r.	Pender de alguna cool, Posetrado de dedor.	possicated with chef.	
	Majanistarse con alguno,	to stake oneself hated by say-	Pensar cu alguna com, Perder de vada,	to depend spen mything, possinated with greef, to thesk of onything, to lose eight of.	
			Perder de vasts,	to lose aight of. to lose one's way.	
	Manat agun de una fueule.	to bring water from a foundable.	Perdette en et cammo,	to appe days with horness	
	Manco di una meno, Mentener conversacion d al-	Mainted of one band. to keep up convention with	Percenta de rosa.	to dee said length se.	
	Manual Construction of 11-		Percersio de resa, Peregrisar per el mundo, Peregrisar per el mundo, Peresguelo per eneralgos, Peresider d'alguno,		
	guno, Manlemersa de yerbus, Maquinuren, coher, diguen rosa, Marayillaran de alguna cosa,	to live spon borts to contrive outling.	Perseguato per eneralgos.	pormed by occurry. to persuade anyone, to be persuaded of sourching.	
	Maquintares, rober, signou ross,	to contrive onything.		to be personaled of something.	
	Mande elen duendos.	to control structure. to wonder at mything, more than a bandred discals, to kill occured with labour.			
	Matares en trainier,	to kill correlf with labour.	de otro, Pertrecherso de lo necesario,		
			Pertrechirus de la necesario,	to provide orients with more-	
	Modirac con any forezas,	to not according to one's otili-	Picerne de alguna casa,		
		ties. lo weigh one's weeks.		exactly like unyour. to be torsecuted by plouples.	
			Plogares de grantes, Pobler de árbolos,	to be formented by pumples.	
	Medirso en ins palatiras,			to fill with trues	
	Medirse en ins pauneus, Mejerar els emples, Meter en emprés.				
	Meditse en ias paniaras, Mejerar sla emples, Meter en emprés, Meteras d'entellers,	to put susier the necresty, to affect the character and dignity of a graticuses.	Pobleres de gente, Ponderar de grande,	to be peopled by persons.	

SPECIFICATION.—The distinct expression of the items or details of a nuntter.

SPECULATION.—An incurring of heavy risks with a view of obtaining a more than usual profit.

STANDARD.—A fixed or determined point by which certain things are adjusted, as a standard of value, quantity, or quality.

STAPLE.—The chief article or articles of a conntry's production and commerce.

STATISTICS.—A collection of facts relating to the condition and progress of the whole or part of a State or its commerce.

State or its commerce.

STATUS.—Used commercially to imply a man's position and condition with regard to money matters.

STERLING.—The denomination given to English money.

STOCK.—Accumulated goods or money. By dealers, goods in possession are spoken of as stock on hand. By commercial mon and bankers, their amounts of capital are called stock. The term also applies to any of the various capital debts of different countries, which are termed collectively Stocks.

STOCK EXCHANGE.—A, building where stockbrokers and jobbers meet to transact their business. STOCK-BROKER —See *Brokers*.

STOCK-JOBBER.—A member of the Stock Exchange, and dealer in stocks and shares, carrying on operations with other dealers and with the public through the medium of the stock-brokers.

STOPPAGE IN TRANSITU.—The Fight of a seller of goods to recover them while in course of transmission to the buyer or his agents, if, since their purchase, the buyer has become bankrupt or inselection.

STRANDING.—The running of a ship on shore or on the rocks, and leaving it stationary there for any length of time.

length of time.

SUBPERA.—A writ calling upon a person to appear at the day and place named in the writ, under a penalty.

SUPERCARGO.—See Cargo.

Suspension of Payments.—A trader ceasing to pay any of his debts on becoming aware of his inability duly to discharge the whole. TACK.—Sec Lease.

TARE is a deduction for the weight of a packings in which goods are secured. It is of three kinds—actual, avenue, and estimated. Actual turn is when each package is weighted separately from its content; arrange tere is where the packages are munerous, and of a similar six and character, and a few are weighted so as to form an avenue for the whole; and etrimated tere is where packages in

particular branches of commerce are so invariably

alike as to warrant a fixed percentage allowance for them.

TARIFF.—A table of charges. Also an enumeration of articles on which duty is levied, with the various rates charged, as well as the articles that are prohibited or exempt.

TENDER.—An offer in writing to supply certain goods, money, ships, or articles that may be required upon specified terms and conditions. Also a presentment or offer of money in satisfaction of a debt

or claim.

TONNAGE.—A ship's carrying capacity. Registered tonnage and actual capacity sometimes differ

considerably, owing to the build of the vessels.

TONTIND—The system of raising money by granting life annuities to a number of persons with benefit of survivorship as the lives fall in, until at a single survivor becomes entitled to the White.

TRADE, BOARD OF.—A department of the Government organised to control all matters having regard to the trade of the country and to the colonies. TRAVILLER.—A person engaged by wholesale

honses and manufacturers to canvass for orders, collect money, and represent their interests away from their place of business.

TRET.—An allowance of 4 lb, on every 104 lb, on

certain articles of merchandise for dust, etc.
TRINITY HOUSE.—An establishment incorporated

by charter in the interests of invigation and commerce; it is empowered to erect lighthouses, appoint pilots, settle the rates of pilotage, conduct the examination of mariners, and regulate, in many respects, the marine affairs of the country.

TROVER.—An action for the recovery of personal property, or for damages.

TRUCK SYSTEM.—The system of paying the whole or part of workmen's wages in goods instead of money.

TRUSTEE.—One who is entrusted with the care or management of property or a business for the benefit of others.

·ULLAGE.—The quantity deficient in casks of liquids.

UNDERWRITER.—In marine insurance, generally applied to the individual insurers at Lloyd's and elsewhere, who underwrite or subscribe their name to each policy they are concerned in.

USANCE.—The established custom or usage of different places as to the periods for which foreign bills of exchange are drawn The following are the usances at the respective places —

Amsterdar				1 month's date.
Antwerp				1 ., ,,
Altona				1 days after sight.
Augsburg		-		15 days after sight.
Barcelona	-			50 days' date.
Berlin .				14 ,, sight.
Bilboa				2 months date.

Bremen					1 month	s date. '
Bordeaux					30 days'	
Cadiz					60	
Danzig					14	sight.
Dresden					14 ,.	
Frankfort-	m-th	e-Ma	ine		14 ,	
Geneva					50	date.
Genos.					3 month	s'
Gibraltar		٠.			2 .	sight.
Hamburg:					1	date.
Leghorn					3 ,,	
Leipzig					14 days :	dght.
Lisbon					30	inte.
Madrid					2 month	a sight.
Malta .					30 days' o	inte.
Milan .					Smonth	≤' date.
Naples					3 ,,	
New York					60 days	
Oporto					30 ,,	**
Patermo					3 month	s
Paris .					50 days'	**
Rio Janeiro	•				50 ,	
Rotterdan					1 month	8 ,
Sydney					30 to 90 d	laya sight.
Tracate						
Venice					3 month	s date.
Vienna					14 days' s	ight.

USUNX.—The legal rate of interest in England having at one time been 5 per cent, any excess upon that rate, excepting as regarded bills of exchange, was denouinated usurious, and was by the then usury laws rendered filegal. These laws having been abolished, money-dealing is now entirely unrestricted in this respect.

VENDOR.—The person on whose behalf a sale is effected, or who is himself the seller, is termed the Vendor; and the one for whom a purchase is made, or who is himself the purchaser, the Vendoe.

VOUCHER.—Donumentary evidence or proof in writing of the payment or receipt of money or of other transactions.

WAREHOUSING.—A system of storing imported goods in public warehouses, on their being landed from the vessels, pending their disposal for home consumption or re-exportation.

WARRAYT OF ATTORNEY.—A power given by a ellent to his attorney to appear and plead for him, or to suffer judgment to pass against him by confessing the enuse of the netion to be just. Also generally applied to power given by one person to another to transact any specified form of business at the risk of the person giving such power.

WARMATY.—In marine insurance, certain or pressed exceptional conditions affecting the subjectmatter of the policy, such as the periods of a ship's saling, or the linbility of insurers for average-claim. In life assurance, the stipulation contained in the policy to the effect that the declaration as to lead th, etc., signed by the assured, shall become a condition of the policy.

WASTE BOOK.—Another name in bookkeeping for the Journal. Under the old Italian system it was a book in which the Journal entries were collected and roughly made.

WAYS AND MEANS .- An expression implying the

resources of an individual or concern applicable for certain purposes, and the mode of applying them.

WHARPAGE:—A charge for receiving and removing goods on the quays of the various docks or wharves, either on their shipment or landing.

WINDING UP.—A term applied to the closing up of any transactions or business. An Act of ' Parliament compels the winding up of the affairs of public companies under certain circumstances.

ENGLISH LITERATURE -XIX

DEFOE TO COWPER.

DEFOE, born in London in 1663, was the son of a butcher, and became a bosier soon after leaving school. Ero he entered on this trade, however, ho had already scribbled a little. He joined Monmouth's rising in 1685, thereafter specolated in one or two mercantilo adventures, became bankrupt, struggled into business again as a tila manufacturer. and then obtained the post of commissioner on glassduties. When King William came to the throno, the Jacobites called out upon him as a foreigner; but Defoe, who all through his life was a Whig partising. defended His Majesty in a satire called "The Trueborn Englishman." This had a prodigious success; 80,000 copies were soon sold off in the streets. . Other successful works of Defoe's nre: "Moll Flanders," "A Journal of the Plague" (fictitions, but often taken for true history). "Colonel Jack," "Captain Singleton," "Memoirs of a Cavalier," and "Roxana." It was not until Defoe had lost his fortune and health, and had omerged from a prison, . partially paralysed, that he began his "Robinson Crusoe." This appeared in 1719. It has been translated into overy Enropean language. Founded upon a few incidents in the life of a Scottish seaman ... named Alexander Selkirk, it deals with fictitions circumstances in such a minute and seemingly veracions manner, that the reader feels Robinson Crusoe as living a reality in his mind as Columbus. Defoe had a hard life, and died in London, in 1731.

wom out with disease and misfortine.

"Robinson Crosso" was Defos greatest work; but some of his other stories, like "Moll Flanders" and "Colond José," more distinctly indicate the work he did in directing the attention of literary mone from classed and romantie mbjeets, and fixing theat on life around them. Defor's manner of studying life was occure; and the could describe things and indicates better than character. Smussl. Richardson, however, took up' his pen, and gave us minute places of character items, with catalities so of character items, with catalities excited studies of character.

Samuel Richardson was born in Derbyshire in 1689. and became a printer in London. He often exercised his pen in writing indexes, prefaces, and "honest dedications" to the volumes he printed and pullished: but real authorship he did not attempt until he had passed his fiftieth year. Two brother booksellers desired him to write a collection of familiar letters, for the instruction and edification of youth, Richardson pondered the task for some time, and conceived that he might possibly introduce "a new species of writing that might turn young people into a course of reading different from the pompand parade of romance writing, and, dimlnishing the improbable and marvellons with which novels generally abound, might tend to promote the course of religion and virtue." So the result was that this collection of letters became the first real English novel, and appeared under the title of "Pamela, or Virtue Hewarded," These letters, passing between several people, tell us of a pretty bushful young servant girl, to whom her wealthy young master makes love in rather a free fashion. The girl's modesty prevails triumphantly in the end, and virtue is rewarded by her cetting the rake to propose real marriage to her. She drives off with him to church, and goes home to make him happy ever after by lithing lds housekeeper "to make jellies, confits, sweetments, marmalades, cordidas, and to not, candy, and preserve." It was curious that the long-drawn story of this young girl's temptation should have been selected by Richardson for the reading of youth, and still more curious that divines like Dr. Slovock should publicly praise the tendercy of the look from the pulpit. Dr. Watts was more year the mark when he told the author that a young woman could not read it without blushing. The moral of the whole thing is not so high-pitched as Richard-on supposed, being pendential at the lest. The minutely delicate touches of human character with which the novel abounds are wonderful and faschating, and although no sentence in the book stamps Richardson as a great thinker, the complative effect of what he writes amounts to the effect of true genius. "Clarista Harlowe," in right volumes, was

Bichardson's uset most. Its execution is shuffer to fact of "Pameda" and its morality is just as doubtful. Clarica is less loyable than Pamela, and area-throads like as if she had a treatis- on propriety always in her hand. This most contains the classic Loyabac, an econophiched, logenious, handsome, illiatious profilicate. As a contrast to Loychez, Richardson has given us his biter of an Dagilish Richardson has given us his biter of an Dagilish Illistory of Sir Clarics Grandison." People lands low vigin, they read this book; and it never succeeded so well as its predecessors. Sir Charles Grandison acts and talks like a figure that has just ' stepped out of a "moral waxwork.'

Of course, many laughed at Richardson's numberpandiness, even while feeling his pover. Henry Fielding resulted to burlesque him Fielding, born near Glastonlary in 1707, had been student, man of pleasure, spendthrift, playwright, lawyer, all in turn, before he loonght forth his parody of "Pamela." It amerated in 1712, and was called "Joseph Andrews." He "lmilded better than he knew," In satirising Richard-on, and alming at burle-que, he really drew pictures of England and English people that were the most graphic ever written. His next efforts were "A Journey from this World to the Next," and "Jonathan Wild." Then came his masterpiece, " Jum Jones," In this novel he certainly takes our breath away pretty often. He is frank to a fault, he nothing extenuates, but tells us all he knows about the life of ordinary Englishmen and women of lds day, who cat plenty of beef and drink plenty of ale, and love sport and horseplay, and talk in very plain speech, with jokes that would shock any of us now. Tielding, more than any other writer, has drawn John Bull. He is not particular as to the circumstances with which he surrounds his characters; but his teaching as a whole was healthy. His Tom Jones, who was meant as a port of antidote to the priggish Sir Charles Grambson, is a sad young dog at times; but it is the very healthiness of his blood, and the heartiness of his character, that land him in such scrapes. Honesty and manliness are his backbone. After the comewhat sickly sentimentalisms of Richardson, which at the best prenched norative abstention from numerality rather than spontaneous goodness and generasity, Fielding's teaching was of service. Two years after "Tom Jones" was published. Fielding received £1,000 for "Amelia," which is almost as good as "Tom Jones," The novelist's first wife was named Amelia; and this back may be said to be a tender tribute to ber memory. Fielding died at Lisbon in 1754.

Fielding, whom Hyron has called "the power linear of lumin nature," took large views of everything; he dealt with things in the ranch, as it were Laurence Sterne did the opposite. Any trivality chapters out of. He was a quite of human nature; there is in him much of the nuclam holy-acreem which Shakespeare parts into his "Jaques". Like Jaques, he rather pithes himself on eccentric manners, and you never know what he will say neet. In 1720 his first bank beam trappent, "The Life and Opinhuss of Fretram Shandy, Gent." This incidents, half-linited criticisms uson life, and and incidents, half-linited criticisms uson life, and and forms a proof of the nation to which a vessel belones. RE-INSURANCE.-A sub-insurance effected with others by insurers who have incurred too great a liability, or who have become dissatisfied with the unture of the risk they have contracted to take upon

themselves. RELEASE FOR FREIGHT .- A formal release given by the owners of vessels or their agents on receipt of on amount of freight, when notice has been proviously given by them to the dock companies or wharfingers to stop delivery of the goods pending

its payment. REMITTANCE,-A sum of money or bills of exohange sant from one person to another. RESERVE.-A fued set aside for the purpose of

meeting any extraordinary contingencies or losses likely to nrise in the course of business. RESIDUE —That which is left of an estate after

all claims upon it have been satisfied.

REST.—In banking, the accumulated a

profit applicable for the purposes of dividend.

RETURNS.—A term applied to any merchandise or bills of exchange purphased as a means of returning the proceeds of consignments received; also the

omoust of a trader's sales. REVENUE-Income derived from a collective source; usually applied to the annual receipts of a country from taxes, Costoms duties, and other

99241109 REVERSION—REVERSIONARY INTEREST.—A right to the possession of money or property ot a certain future period, or after the death of another.

SALARY.—A stipulated annual or periodical paymost for services. SALVAGE is compensation allowed to persons wh

are instrumental in saving goods or ships from the dongers of the sea, or from fire. SAMPLE.—A small partion obtained from the bulk of onvarilele of merobandise to serve as a specimen

of the whole.

SCHEDULE.—A sheet of paper appended to any written instrument, and containing a detailed statement or a list of the property mentioned

SCIRE FACIAS.—A writ most commonly Issued to call a person to show cause to the Court issuit it why the execution of judgment previously pass ngninst him should not be made out

therein

SCRIP CERTIFICATE.-A certificate given in receipt for money paid for shares in public companies preliminary to the registration of subscribers; or of instalments paid towards public loans previous to

the issue of the bonds. . SCRIVENER .-- A negotiotor of monetary transactions, octing as a middle-man between burrower

and lender. Also one who is employed to draw up and engross deeds, conveyances, and securities for

SEARCH WARRANT .- A warrant granted by a magistrate, directing any given pren searched-generally for stolen goods. SEAWORTHY.-A term indicating that a vessel is

in a proper state of repair, and in every woy fitted for her contemplated voyage. SECURITIES.—Documents representing or securing a right to money or property of muy kind, such

as bills of exchange, warrants, deeds, bills of lading, olicies of insurance, leases, and bonds, SHISIN.—The ownership and possession of freehold

SEQUESTRATION.—The oporte by which the estates of insolvent traders and others in Sootland are realised and divided among their oreditors.

Equivalent to the term Bankruptcy. SET-OFF.-A counter claim by the person on whom a demand is made; the sum due by one

operoting as payment or part payment of the sum . se by the other. SETTLEMENT.—The adjustment of an account or im. Generally applied to the payment of occounts -

in full of all demands. SHARE-SHARES.—The proportion of interest in any undertaking or company.

SHIPMENT.—A quantity of merchandles sent by a vessel to either a foreign port, or one in the same

country. SHIP'S PAPERS generally consist of the certificate of registration, manifest, moster-roll of erew, and log-book, with sometimes a charter-party and hill-

of health, SHORT EXCHANGE.—Bills of exchange drawn for short payment, at sight, or three days ofter sight. Sig.—A Latin word signifying "thus," or "after

this fashion." SIGHT.-Presentment of those bills of exchange . whose due dates are determined by the period at

which they are first seen, or sighted, by the persons on whom they are drawn. SINE DIE,-Signifying "without fixing any doy

for re-assembling"; thus, "to adjourn sine die." SINKING FUND .- An accumulative fund set npart for special appropriation, such as the extinguishment of a debt.

SLEEPING OR DORMANT PARTNER.-A partner who does not assist in the management of a busi-ness, but who receives a share of the profits, and is also liable for a share of the loss.

SOLVENCY.-The state of being able to pay all debts in full. The adjective descriptive of this state in Solrent.

SPECIE.—Coined money of any description.

sport of wis after the manner of Rabelais. Some of the with quite shocking, and one must any of Sterme, officasive to delicecy. Tobbas Smollest was born as Keats and of Byron, that his was a talent than one Damberton, Scotlandin, in 1721. Like Pickling, made solemnities out of trifles, and solemn things ' he tried soveral kinds of life before becoming a



p. rnon van Rivan. (From a Photograph by Polentine & Sans. Dander.)

into trifles. Novertheless, tenderness of a strangely deliente kind is not wanting in the work of this pruriently-minded man : "Tristram Shandy" contains one of the most beautifully and pathetically told stories in any language, the story of Lefevre. Sterne's other masterpiece is "A Sentimental Journey through France and Italy," He had been born nt Clonmel in 1713, and spont the most of his life in a position which be neither suited nor adorned, that of an English country parson. Some volumes of his sermons were published. He died in 1768.

Sterne was a wit: Tobias Smollett was a humorist. Sterne smiles at ns; but Smollett knighs with us. Sterne sees far deeper into nature than Smollett does; yet Smollett is quite as healthy reading as the author of "Tristman Shandy." Smollett is the legitimate successor of Fielding, and will more you with real fun far more than Fielding will; but the novelist. Playwright, surgeon's mate, city doctor, satirist, he only found his trao work in 1748, when he produced "Roderiok Random." This rollicking story embodies much of his personal experiences. Smollett's other novels, all marked by strong humour. are: "Peregrine Pickle," "Ferdinand Count Fathom,"
"Humphrey Clinker," "Sir Lauricelot Greaves." Smollett executed other literary work besides, as, for instance, a translation of "Don Onivote," and a "History of England" in four volumes. This history ruined his health; he died in 1771.

Novel-writing now takes a purer strain in our, literature. Oliver Goldsmith, an Irishman, born in 1728, came to London after many vagaries, and settled down as a literary man in the year 1756. He was a merry, open-hearted, reckless fellow, full of ideas, but devoid of the common sense pecessary for their development. He was invited to write for

of Stobs Pogis. Churchill penned a good made the little statistical between the little statistical powers, and William Cowpen, born at Grantz Bouns; and the state of
The outstanding figure among all these writers in the beginning of the eighteenth century is Dr. Samuel Johnson. Johnson was born at Lichfield in 1709, and had many a hard struggle in London before he attained any pecuniary comfort as a literary man. His chief work is his "Dictionary of the English Language," truly a gigantic task to accomplish and accomplish so ably. The essays published under the titles of "The Rambler" and "The Idler" were well received; his tiresome "Rasselas," a tale written to pay the expenses of his mother's funeral, was still more popular for a timo, although, as Macaulay has remarked, the author in his Abyssinian romance "transferred the whole domestic system of England to Egypt." A groat service was done by Dr. Johnson to our literature when he published his "Lives of the Poets." These contain condensed information and criticism of a very valuable character, though, as a critic, he occasionally went curiously far astray. In writing of Johnson, we must never forget James Boswell, who has attained immortality by his biography of his patron,

THE ROMANTIC SCHOOL.

Robert Burns was born near Ayr in 1759. He worked on his father's farm when a lad, and had little to read except Mackenzie's "Man of Feeling" and a book of songs. Verses of his own began to be circulated about his home, and afterwards in the neighbourhood of Mauchline, where he settled for a time. Boon companions liked to drink with him, and hear poetry from him. His life grew disreputable in several ways. It had its gleams of triumph, however. He was feted for a season at Ediuburgh, and a collection of his poems, originally printed at Kilmarnock in 1786, went through more than one edition. But fortune never smiled serencly upon him. The staple of his income was about £70 a year, earned in the capacity of exciseman at Dumfries. Broken by the strife of a proud spirit with hard circumstances and inflammable inclinations, he wasted himself away in drink and riot, and died miserably in 1796. The world had not taken

the least care of him. It was only after he had been sancthed from it that it recognised wind a gift of God to humanity a heart like his is. It had throbbed and thrilled itself into lyrics as purely beautiful as ever pen trunscribed. He is all heart as poet. Not feel the warm blood palsing warmly of the high proper who reach the poetry of hems gets as seen the accrete sources of human emotions as can be a feel as core sources of human emotions as can be a feel as core sources of human emotions as can be a feel as core sources of human emotions as can be a feel as core sources of human emotions as can be a feel as core sources of human emotions as can be a feel as feel a

Walter Scott was also a revolutionary, but only in a strictly literary way. His was a happy, sound nature that goes with steady work and strong direction and undisturbed sleep. . He did not feel himself "born to put the crooked straight"; but he was sick of the sillinesses and commonplaces that were so rife in the fashionable literature of his time. and he determined to try his hand at something better. He was the son of a lawver practising in Edinburgh, where he was born in 1771. He was rather a dunce at school and even at college he was ' nicknamed Duns Scotus. By-and-by, pinned to a desk in his father's office, he secretly regaled himself, not with deeds and statute-books, but with ballads and romances of chivalry. Scott's mind would have echoed the whimsical saying of Charles Lamb, "Hang posterity! Let me write for antiquity." His heart was ln bygone ages, and he made the past a pageantry. His first novel was "Waverley" (1814). When this had taken the kingdom by storm, he went to work steadily to produce a long series of romances of the same kind. In earlier years he had also oreated a sensation with his romances in verse, of which the bost are "The Lay of the Last Minstrel," "Marmion," and "The Lady of the Lake," George IV. made him a baronet. He had built himself a sort of baronial palace at Abbotsford, and entertained there in princely style. Then disaster came through commercial relations with Constable and Co., printers. Scott lost £150,000. At once he began the task of paying off all his creditors and retrieving his fortunes. He wrote "Woodstock" for £9,000, and a "Life of Napoleon" for £18,000. Many other labours succeeded these, and were him out. He died at his beloved Abbotsford, with the Tweed murmuring in his ear, on the 21st of September, 1832. Sir Walter Scott is free enough in his treatment of history; he is content to extract from it romance, not bare fact. Yet to him we owe, not mercly the pleasure of the ordinary novel-reader, but a sense of vivified history which duller, if more accurate, chronicles do not afford us. The historian peers into the dim past with a candle, and shows ns facts in their truth. But Scott leads us into it with a many-coloured lamp, and lights it up with dazzling bues.

the Public Ledger, and to the pages of this newspaper he contributed the papers now so well known



JOHN KHATA. (From a Portrait by Secres.)

IN "The Citizen of the World." Dr. Johnson took

him up, and introduced him to the great literary "The Traveller," a fine poem, soon proved what stuff was in him. But debts lay heavily on his conscience and his imagination. One day he had to send and ask Johnson to help him out of some possining difficulty. Johnson went to see him, and found he had a prose tale lying nericcted in his desk. This Johnson was able to sell at once to Newbery the bookseller, for £60. It was "The Vicar of Wakefield." idyllie, yet natural charms of this story will never die; it has proved the most popular novel in the world. Unmalched simplicity of narrative style, delicate and unobtrusive hus variety of situation and incident, and beautiful sympathy with goodness, make this wonderful tale inexpressibly dear to all lovers of literature. There is that universality of human interest in the "Vicar of Wakofield" which appeals to renders of all ages and all nationalitie s. The child of nine engerly devours it; and Gootho has recorded that it was a powerful factor in the development of his intellectual life. With the "Vienr of Wakefield" the period of the classic English novelists may be said to end-The fiction of that time had reached a perfect

The lovely artlessness of Goldamith's expression cave its characteristic characte

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as to his prose. Goldsmith's verse is to Pope's what a sweet wayside hedge is to a Datch garden. Pope's poetry is all head work; Goldsmith's is full of affections, sympathies, charities, extended

poetry is all band-work; Goldantjiks's fail of disclotions, synapsithes, charities, extended disclotions, synapsithes, charities, extended prompty constitution of the constitution of the prompty constitution of the constitution of the last." as the constitution of the constitution of last." as the constitution of the constitution of the last." as the constitution of the constitution of the last constitution of the constitution of the constitution of the vance bits time band made in appreciation of the external universe must be noted. Galdtic external universe must be noted. Galdconstitution of the constitution of t

James Thousen, a Sociohusan, author of
"The Servon," The Casto of Indolune,
and other poetical works, was a contamporary
of Golds-midris, and like late has legad to the
atternation of the second of the
nature Absentide, with work of "The Eleasure
of the Imagination," either harbed back on
the Casto of the Casto of the
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THEY BYENE SAELLEY. (From the Dreading by Miss Current.)

productions is his very perfect "Elegy written in a Country Churchyard." The churchyard was that male intellect, wedded to the female intellect of Keats, would have produced a Shakespeare. Coleridge died in 1834.

Mohert Southey, born in 1774, is not much valued now, though he was Poet Laureate, and a great man in his time. He wrote an enormous quantity of romaintic yers, as well as prose. His best pouns, scarcely ever rend in our day, however, and "Roderick." Southey worked hisself into a state of mind bordering on idiotey, and died in 1843.

William Wordsworth, born in 1770, obassed the

whole current of English poetry. He it was who first truly lored and studied external nature list is simplicity and its mystery. Ho is the high priest of nature. It had been the sian of Coleridge and Souther, as well as of Wordsworth, to ostitivate the study of nature at first hand; but Vorghworth had the treest instincts and sympathies to guido line in tent loving revorential study. He spittualises the hills, finds, "in the meanest thing that grows thought that do often lie too deep for tener," and southern the colors lie too deep for tener, and soul from communion with the spirit of the green world around us. He has his bulkcoody of life too. as well as of matras, and a noble philosophy; it is, as, anyone will remember who has rand his "lutimation," anyone will remember who has rand his "lutimation." I munorability from Recollections of Randy Childhood. "Wordwoorth's noist importants words are: "The Excursion "(a long semi-philosophical poem), ""Phe White Doe of Rylston," "Arraw Rockitics," "Scoolssizticial Sketches," and "Sonnets on the River Daddon." No post ever held a higher ideal before him than Wordworth. We get no passion from him. As is as been said, "There's no trumples stop in his poetry." Vet, at any rate, he misses our imagination and interest to a very high and 'grow range of thought, and teaches us, with a very clincit teaching, how we may ennoble conseries.

Wordsworth, who, like, Souther, had become Post Laureata, died in 1850. The posts who have been unentioned in this chapter had few contemporates who wrote first-rate prose—cocyet, their critics. The postical spirit was completely dominant in the early part of this century. This postical spirit, swe have soon, was characterised by political feyrour, and also by a revived interest in romaneo. Many of the poets who then dreamt and wan of liberty liked to see their political hopes dispelled. But the romanee which they copened up to us has not yet been exhausted by writers of our own, time.

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Scott had been tempted by popularity to stake his chances of fame on his poetical efforts. But he was wise, and recognised that a far truer poet was competing with bim. That was Byron, George Gordon, Lerd Byron, was born in London in 1788, and as early as the year 1807 he had acquired notoricty as a elever but selfish man of pleasure. In that year he published a volume of verse entitled "Hours of Idleness." This was ridionled by the Edinburgh Racies; and the article in this periodical drow from him the bitter satire, "English Bards and Scotch Reviewers." Byron soon developed to maturity all the vices of Burns, in fuller me and without the excuses Burns lad. With Burns poetry was the life, vice the accident. It almost ons as if, for a time at least, vice was the life of Byron, and poetry the accident. In 1812 he published the first two cuntos of "Childe Harold," and he records that "he awoke one morning and found himself famous." The romance that was in the air at that time now impelled him to write tales in possionate verse such us "The Glacur," "The Bride of Abydos," "The Corneir," "Larn," "The Prisoner of Chillon," "Munfred," His "Childe Harold" was likewise completed, and he startled the world with an amazingly elever licentlous poem called "Don Juan," about which almost anything bad or good muy be said. Byron wrote many memory-hannting lyrice; his descriptive powere were of n high order; and his dramatic talent, though irregular, was strong. His chief fault is poetle egotism; his self porvades all that he writes. Macaulay likens him to the India-rubber face in the toy-books, which thrests itself through page after ngo, and puts the same head on all sorts of figures. He died in 1824 at Missolonghi, whither he had gene to give a little glory to his tarnished life by fighting for the cause of Greek independence. We have still to notice two bands of poets in

whom modore leleas were formenting during this period. One of these bands was selled supported. The of these bands was selled supported. The of these bands was selled supported to the supported the supported to
born in London in 1796, and became articled to a

surgeon, and afterwards attempted to practise for himself. His real bant, however, was towards literature, and his first poem, "Endymion," appeared in 1818. The Quarterly Review and Blackwood's Magazine vilified this grand poem as moundering, meaningless trush. Keats by-and-by brought forth another volume entitled "Toles and Poems ained the noble fragment, " Hyperion," besides the mystically beautiful "Eve of St. Agnes," and several other rich additions to our literature. Kents was of a consamptive tendency, and went to Italy to ward off the complaint. A hopeless love, howover, combined with the consumption to prey upon him, and he died at Rome in 1820. In sensuous appreciation of the beautiful, Keats is unsurpassed. Richness of phraseology gives to his pages the many-hued glory of stained glass. Beauty is everything to Keats, undeveloped as he was; he has little to touch but the joy of oxisting

to took but the jet of cistings. There is a superior of the property of the pr

The other band of poets was the famous Lake School, so-called because the writers who formed it dwelt more or less among the English Lakes Calcridge, Southey, and Wordsworth were the great Lake Poets. In their youth they invoured revolutionary and socialistic notions. They hatched a grand schome for setting up n miraculously insocent colony "on the banks of the Susquehanna." It sounded very well; but as they had semeely o fiveound note among them at that time, they had to abandon the emigration scheme. They married instead, and two of them at least settled down ieto staid Conservatism. Samuel Taylor Coloridge, born in 1772, was an incessant thinker and a descitory writer. The chief poems he line left are the weird ghost bailed cailed "The Ancient Mariner," and "Christnhel," a poem which everybody is compelled to admire, and nobody clearly understands. He was full of metaphysical and poetical power. His

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| Sillege, IV, 193                                 | Acoustics.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Standard cells, V. 83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Bilique, IV. 254, 265                            | by liquids and solids, VI, 201                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Stannie ehloeide, V. 194                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| - Raw and manufactured I 227                     | Difference in IV. 293                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Star Chamber, The, II. 214, 270, 280;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Weaving, L 286                                   | of, VI. 255                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Standarder The II 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Silurian avatem. IV. 10                          | , Production of, VI. 294, 350                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Stna-Sab, VIII. 53                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Salver, IV. 274, 276, 352; V. 200; VII.          | - Various number of vibrations to                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Star polygon, To construct, 11.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Antimonyal, VII. 553                             | South Robert WIII see                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Sturches, VI. 180                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| blockened by york of an egg IV. 267              | Southerne, Thomas, VIII, 256                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Bissa, Describing position of, I. 254                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Silver, German, V. 180                           | Southey, Robert, 365, 366                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | , Motions of, L 189                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Simale cedron, IV. 103                           | Southwell Chihedral, VII, 833                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | State The VIII 194 150 : Constraine of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Simon do Montfort, L et a                        | Bovencigo, VIII. 125, 127, 211                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | VIII 948                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Simpson's rule for culculating areas,            | — when V, bet VII. 56. Gos Gos Good Count overgraph is a by VI. 50. year. 50. Gos Good Count overgraph is a by VI. 50. year. 50. Gos Good Count overgraph is a by VI. 50. year. 50. Good County of the | Stanger, Jahrenfers, 111. 100; sillaris, silla |
| Singley, I. 205; II. 105; company of             | Sovereign, Sterling weight of, VIII. 55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Statles, IV. 141; V. 587                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| VOICES, III. 148                                 | Spedix, A, III. 871                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Stavrolite, VIII, 90                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Slubonem. VI. 217                                | Spain and Portugal, III. 265                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Steam, IV. 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Shaouls, V. 202                                  | -, Gothic Cathedrels of, VIII, 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Bleel, III, 224; V. 129, 130                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Street, The VIII, 1813                           | The Sarnceus in, IV. 528                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Stresson of, VII. \$45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Sirenes, VIII. 810                               | Spaniolite, VII, 556                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Stellaria media, V. 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Skeleton, Human, I. 85; memmelia,                | Spanish :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Stems of plants, 111, 152                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Skelton, John, VI. 308.                          | VIL. 41, 165, 169, 242, 808, 870                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Steunes, I. 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Sketching from Nature, VI. 16, 78, 143           | VIII. 60, 213, 178, 231, 298, 342                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Sterculinoess, V. 26, 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| The human, IL 160; VItL 175                      | Sponish Power, II, 151                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Stibuite, III, 176: VII, 501                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Skull, Humau, 1, 24, 64; 11, 245                 | Sperganeum, V. 266                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Steams, Archibishopof Capterlury, I. 137                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Slote, HL 97; VII. 851; for roofing, L 235       | in, V. 255, 540                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Still, John, VII, 193                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Siave Coast, IV, 57                              | Specific gravity, III. 90 ; V. 57, 822; of                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Stips tonacissmus, 1V. 212                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Siavonio or Windle race, The, 11, 316, 318       | VII. 164; of solida, V. 58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Stock Exchange, IL 290; VIII. 840                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Sleeping partner, VIII. 548                      | Spectroscope, The, VII. 256, 250                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Stock-broker and stock-jobber, VIII. 540                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Sluys, The Battle of, II, 34                     | Speech, Ormos of, IL 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 346 stores, etc 111. 18, 250; VIII.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Sunitine, VII, 515                               | Speed, John, VII. 130                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Stocks, Exposure in the, I. 880                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Swell. The ormu of VII. 200, 201;                | Suemocr. Edward, IV. 75; VII 8, 60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Stokesay Costie, VII, 554                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| VIII. 41                                         | Spergularia, IV. 201                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Stomeon, The, J. 198, 356; experiments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Southfield, First martyr at, IL 100              | Spheue, VIII, 80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Stonecrop, V. 148                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Smithsen, Robert, VIII, 200                      | Sphina; The, I. 324                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Stonehange, I. 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Snott, The, VI. 182; the eye of, VII. 174;       | Spices, I. 270                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Storm warnings and signals, VIII. 233                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| the tongue of, Vill. 113                         | Sphlere, VII 191, 244                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Storm glass, VIII. 166                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| glands, etc. of, VIII, 187, 188; poston          | Special Property of the Control of t | Strafford, Earl of, IL 215, 276, 250                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Snapdrugon, IV. 256; V 227                       | Spinal cord, The, I, 135                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Strain, Laws, etc., of, VII. 842; VIII.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Show-herry, V. 180                               | Soine, The human, I, 24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Straits Settlements, II. 124                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Snowdrop, V. 351                                 | Spinsl, VIII 97                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Straw plaining, I. 236                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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